JOURNAL

OF

BACTERIOLOGY

VOLUME 111

BALTIMORE, MD. 21202

1972

JOURNAL OF BACTERIOLOGY

VOLUME 111

EDITORIAL BOARD

L. LEON CAMPBELL, Editor-in-Chief (1975)
University of Illinois, Urbana

R. L. ANDERSON, Editor (1975)
Michigan State University, East Lansing

ROY CURTISS III, Editor (1974)
University of Alabama, Birmingham

S. G. BRADLEY, Editor (1974)
Virginia Commonwealth University, Richmond

ALLEN G. MARR, Editor (1973)
University of California, Davis

H. E. UMBARGER, Editor (1976)
Purdue University, Lafayette, Ind.

Martin Alexander (1972)
W. Lane Barksdale (1972)
M. E. Bayer (1972)
Claire M. Berg (1973)
Richard S. Berk (1974)
Robert W. Bernlohr (1973)
Allan Campbell (1972)
Wesley B. Catlin (1974)
A. J. Clark (1972)
D. Joseph Clark (1974)
Royston C. Clowes (1972)
V. W. Cochrane (1972)
Stanley N. Cohen (1973)
Ronald S. Cole (1974)
S. F. Conti (1972)
A. L. Demain (1972)
John A. DeMoss (1972)
Walter J. Dobrogosz (1973)
Martin Dworkin (1973)
R. G. Eagon (1974)
Alan D. Elbein (1973)
Wolfgang Epstein (1974)
Herman Friedman (1972)
A. T. Ganesan (1972)
Howard Goldfine (1972)
Joseph S. Gots (1972)
Harlyn O. Halvorson (1972)
F. M. Harold (1973)
Leonard Hayflick (1972)
George Hegeman (1974)
Charles E. Helmstetter (1972)
Robert K. Herman (1974)
Joseph T. Holden (1972)
John G. Holt (1972)
Stanley C. Holt (1974)
John Ingraham (1973)
Sam Kaplan (1974)
David E. Kennell (1974)
Hillel S. Levinson (1972)
W. R. Lockhart (1972)
Manley Mandel (1972)
David Mardon (1974)
Paul Margolin (1972)
Alvin Markovitz (1973)
M. L. Morse (1972)
Richard P. Novick (1973)
Leo Parks (1973)
H. J. Phaff (1972)
Allen T. Phillips (1973)
Jack Preiss (1974)
Charles C. Remsen III (1973)
William S. Reznikoff (1973)
H. V. Rickenberg (1973)
Antonio H. Romano (1973)
John Roth (1973)
Harold L. Sadoff (1974)
M. R. J. Salton (1972)
David Schlessinger (1974)
Carl Schnaitman (1974)
Simon Silver (1973)
W. R. Sistrom (1972)
Lucile Smith (1972)
Bernard S. Strauss (1972)
Noboru Sueoka (1972)
Paul S. Sypherd (1974)
A. L. Taylor (1974)
Arthur Weissbach (1974)
N. E. Welker (1973)
R. W. Wheat (1972)
Helen R. Whiteley (1972)
Meyer J. Wolin (1973)
Frank E. Young (1973)
Stanley A. Zahler (1974)

ROBERT A. DAY, *Managing Editor, 1913 I St., N.W., Washington, D.C. 20006*

EX OFFICIO

R. G. E. MURRAY, President (1972–1973)
DONALD E. SHAY, Secretary

L. LEON CAMPBELL, Vice-President (1972–1973)
T. J. CARSKI, Treasurer

The *Journal of Bacteriology*, a publication of the American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006, is devoted to the advancement and dissemination of fundamental knowledge concerning bacteria and other microorganisms. The *Journal* is published monthly, and the twelve numbers are divided into four volumes per year. The subscription price is $52 (Postal Union Countries, $54; other foreign, $55) per year. Single copies are $5.00 (foreign, 5.25). Members of the American Society for Microbiology may receive the *Journal* as part of their dues. Correspondence relating to subscriptions, reprints, defective copies, availability of back issues, lost or late proofs, disposition of submitted manuscripts, and general editorial matters should be directed to the ASM Publications Office, 1913 I St., N.W., Washington, D.C. 20006. Correspondence from ASM members relating to membership dues, member subscriptions, changes of address, incorrect journals, etc., should be directed to the Executive Secretary, American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006. Published monthly by the ASM at 428 E. Preston St., Baltimore, Md. 21202.

Second class postage paid at Baltimore, Md. 21202, and at additional mailing offices.

Made in the United States of America.

Copyright © 1972, American Society for Microbiology
All Rights Reserved.

Volume 111 **Contents for July** Number 1

Taxonomy and Ecology

Relatedness Among *Rhizobium* and *Agrobacterium* Species Determined by Three Methods of Nucleic Acid Hybridization. ANN M. GIBBINS AND K. F. GREGORY.. 129

Morphology and Ultrastructure

Deoxyribonucleic Acid Distribution in *Bacillus subtilis* Independent of Cell Elongation. NEIL H. MENDELSON.... 156
Ultrastructural Analysis of Sporulation in a Conditional Serine Protease Mutant of *Bacillus subtilis*. LEATRICE SANTO, TERRANCE J. LEIGHTON, AND ROY H. DOI.... 248
Morphology and Ultrastructure of Human T-Mycoplasmas. F. T. BLACK, A. BIRCH-ANDERSEN, AND E. A. FREUNDT.... 254
Effect of Peptone on *Azotobacter* Morphology. G. R. VELA AND R. S. ROSENTHAL.... 260
Location of Polysaccharide on *Chlamydia psittaci* by Silver-Methenamine Staining and Electron Microscopy. SANITTAR P. DHIR AND EDWIN S. BOATMAN.... 267
Division Site Regulation in a Temperature-Sensitive Mutant of *Bacillus subtilis*. NEIL H. MENDELSON.... 298

Genetics and Molecular Biology

Characterization of Aminoacyl Transfer Ribonucleic Acid Formation Stimulated by Polyamines. YOSHIFUMI TAKEDA, KAZUYOSHI MATSUZAKI, AND KAZUEI IGARASHI. 1
Loss of R Factors Promoted by Bacteriophage M13 and the M13 Carrier State. S. E. RUSSELL AND V. N. IYER.... 7
Initiation of *Bacillus subtilis* Ribonucleic Acid Polymerase on Deoxyribonucleic Acid from Bacteriophages 2C, ϕ29, T4, and Lambda. JACQUES J. PÈNE AND JOYCE BARROW-CARRAWAY.... 15
Synthesis, No Synthesis, or Synthesis and Degradation of Ribosomal Ribonucleic Acid in Various *Escherichia coli* Strains Starved for an Amino Acid. E. CRAIG, D. SCHLESSINGER, AND C. GURGO.... 66
Mapping of *rod* Mutants of *Bacillus subtilis*. D. KARAMATA, M. MCCONNELL, AND H. J. ROGERS.... 73
Chromosome Transfer by Autonomous Transmissible Plasmids: the Role of the Bacterial Recombination (*rec*) System. ERIC E. M. MOODY AND W. HAYES.... 80
Documentation of Auxotrophic Mutation in Blue-Green Bacteria: Characterization of a Tryptophan Auxotroph in *Agmenellum quadruplicatum*. LONNIE O. INGRAM, DUANE PIERSON, JAMES F. KANE, C. VAN BAALEN, AND ROY A. JENSEN.... 112
Abnormal Excision and Transfer of Chromosomal Segments by a Strain of *Escherichia coli* K-12. PETER L. BERGQUIST AND EDWARD A. ADELBERG.... 119
Accumulation of 70S Monoribosomes in *Escherichia coli* After Energy Source Shift-Down. FRANCIS W. RUSCETTI AND LEWIS A. JACOBSON.... 142
Nature of the Elimination of the Penicillinase Plasmid from *Staphylococcus aureus* by Surface-Active Agents. STEPHEN A. SONSTEIN AND J. N. BALDWIN.... 152
Genetic Transfer of Episomic Elements Among *Erwinia* Species and Other Enterobacteria: F'*lac*$^+$. ARUN K. CHATTERJEE AND MORTIMER P. STARR.... 169
Effect of Zn^{2+} on Bacterial Conjugation: Inhibition of Mating Pair Formation. JONATHAN T. OU AND THOMAS F. ANDERSON.... 177
Mechanism of Inactivation of *Haemophilus influenzae* Transforming Deoxyribonucleic Acid by Sonic Radiation. M. L. RANDOLPH AND JANE K. SETLOW.... 186
Genetically Controlled Removal of "Spore Photoproduct" from Deoxyribonucleic Acid of Ultraviolet-Irradiated *Bacillus subtilis* Spores. NOBUO MUNAKATA AND CLAUD S. RUPERT.... 192
Regulation of *myo*-Inositol Catabolism in *Aerobacter aerogenes*. T. K. SUNDARAM.... 284
Mutations Affecting Amino Sugar Metabolism in *Escherichia coli* K-12. R. P. HOLMES AND R. R. B. RUSSELL.... 290
Phenoloxidase Activity in Mycelia Carrying Modifier Mutations that Affect Sporocarp Development in *Schizophyllum commune*. THOMAS J. LEONARD.... 292

Bacterial Conjugation Under Anaerobic Conditions. DONALD R. STALLIONS AND ROY CURTISS III 294
Orientation of the *deo* Genes and the *serB* Locus in *Salmonella typhimurium*. PATRICIA JARGIELLO AND PATRICIA HOFFEE 296

Physiology and Metabolism

Levels of Nicotinamide Adenine Dinucleotide and Reduced Nicotinamide Adenine Dinucleotide in Facultative Bacteria and the Effect of Oxygen. JULIAN W. T. WIMPENNY AND ANNE FIRTH 24
Time Course of Purine Nucleoside Phosphorylase Occurrence in Sporulation of *Bacillus cereus*. HELEN L. ENGELBRECHT 33
Enzymes of the Isoleucine-Valine Pathway in *Acinetobacter*. ROBERT TWAROG 37
Kinetic Properties of Phosphotransacetylase from *Veillonella alcalescens*. R. A. PELROY AND H. R. WHITELEY 47
Transition of Chemlithotroph *Ferrobacillus ferrooxidans* to Obligate Organotrophy and Metabolic Capabilities of Glucose-Grown Cells. FRED SHAFIA, KAREN R. BRINSON, MICHAEL W. HEINZMAN, AND JAMES M. BRADY 56
Synthesis of Pulcherriminic Acid by *Bacillus subtilis*. ROBERT L. UFFEN AND E. CANALE-PAROLA 86
Isotopic Study of Control of the Lysine Biosynthetic Pathway During Sporulation of *Bacillus cereus*. S. W. ROGERS, D. E. PETERSON, R. W. BERNLOHR, AND D. P. STAHLY 94
De Novo Biosynthesis of Nicotinamide Adenine Dinucleotide in *Escherichia coli*: Excretion of Quinolinic Acid by Mutants Lacking Quinolinate Phosphoribosyl Transferase. JERRY LR. CHANDLER AND R. K. GHOLSON 98
Lipid Composition of Growing and Starving Cells of *Arthrobacter crystallopoietes*. LUBA L. KOSTIW, C. W. BOYLEN, AND B. J. TYSON 103
Determination of the Rate of Transformation from Growth Curves of Transformed Streptococci. RICHARD SCHLEGEL AND HUTTON D. SLADE 199
Interrelated Effects of Cold Shock and Osmotic Pressure on the Permeability of the *Escherichia coli* Membrane to Permease Accumulated Substrates. IRWIN G. LEDER 211
Regulation of the Bacterial Cell Wall: Isolation and Characterization of Peptidoglycan Mutants of *Staphylococcus aureus*. ANADI N. CHATTERJEE AND FRANK E. YOUNG 220
Conditional Mutants of *Staphylococcus aureus* Defective in Cell Wall Precursor Synthesis. C. M. GOOD AND D. J. TIPPER 231
Axenic Culture of Myxamoebae of the Myxomycete *Physarum polycephalum*. E. M. GOODMAN 242
Autolysis of Microbial Cells: Salt Activation of Autolytic Enzymes in a Mutant of *Staphylococcus aureus*. RICHARD W. GILPIN, ANADI N. CHATTERJEE, AND FRANK E. YOUNG 272
Use of Neomycin in the Isolation of Mutants Blocked in Energy Conservation in *Escherichia coli*. BARUCH I. KANNER AND DAVID L. GUTNICK 287

Enzymology

Comparative Immunological and Enzymatic Study of the Tryptophan Synthetase β_2 Subunit in the *Enterobacteriaceae*. VICTOR ROCHA, IRVING P. CRAWFORD, AND STANLEY E. MILLS 163
Effects of Proline Analogues on the Formation of Alkaline Phosphatase in *Escherichia coli*. HOWARD MORRIS AND MILTON J. SCHLESINGER 203

Volume 111 **Contents for August** **Number 2**

Taxonomy and Ecology

Vibrio psychroerythrus sp. n.: Classification of the Psychrophilic Marine Bacterium, NRC 1004. J. Y. D'AOUST AND D. J. KUSHNER 340

Ecology of Sulfur-Oxidizing Bacteria in Hot Acid Soils. CARL B. FLIERMANS AND THOMAS D. BROCK 343
Deoxyribonucleic Acid Base Composition of Species in the Yeast Genus *Kluyveromyces* van der Walt emend. van der Walt. ALESSANDRO MARTINI, HERMAN J. PHAFF, AND STEPHEN A. DOUGLASS 481

Genetics and Molecular Biology

Integration Site of Noninducible Coliphage 186. WALTER H. WOODS AND J. BARRY EGAN 303
Induction of Galactokinase in *Saccharomyces cerevisiae*: Kinetics of Induction and Glucose Effects. BRUCE G. ADAMS 308
Ribosomal Ribonucleic Acid Synthesis and Maturation in the Blue-Green Alga *Anacystis nidulans*. W. FORD DOOLITTLE 316
Deoxyribonucleate Binding and Transformation in *Rhizobium japonicum*. J. L. RAINA AND V. V. MODI 356
R Factor Elimination During Thymine Starvation: Effects of Inhibition of Protein Synthesis and Readdition of Thymine. R. J. PINNEY AND J. T. SMITH 361
Location of *trpR* Mutations in the *serB-thr* Region of *Salmonella typhimurium*. C. STUTTARD 368
Mutants of *Salmonella typhimurium* That Are Insensitive to Catabolite Repression of Proline Degradation. SARA LEE NEWELL AND WINSTON J. BRILL 375
Characterization of Strong Polar Mutations in a Region Immediately Adjacent to the L-Arabinose Operator in *Escherichia coli* B/r. MARIANNE ELEUTERIO, BARBARA GRIFFIN, AND DAVID E. SHEPPARD 383
Cell Division and Prophage Induction in *Escherichia coli*: Effects of Pantoyl Lactone and Various Furan Derivatives. EDWARD P. KIRBY, W. L. RUFF, AND DAVID A. GOLDTHWAIT 447
Similarity in the Size and Number of Ribosomal Proteins from Different Prokaryotes. TUNG-TIEN SUN, THOMAS A. BICKLE, AND ROBERT R. TRAUT 474
Fate of Transforming Deoxyribonucleic Acid After Uptake by Competent *Bacillus subtilis*: Size and Distribution of the Integrated Donor Segments. DAVID DUBNAU AND C. CIRIGLIANO 488
Mutations Affecting the Dissimilation of Mannitol by *Escherichia coli* K-12. E. SOLOMON AND E. C. C. LIN 566
Requirement for Protein Synthesis in *rec*-Dependent Repair of Deoxyribonucleic Acid in *Escherichia coli* after Ultraviolet or X Irradiation. ANN K. GANESAN AND KENDRIC C. SMITH 575
Mode of Action of Phleomycin on *Bacillus subtilis*. HARVARD REITER, MARIANNE MILEWSKIY, AND PHILIP KELLEY 586
Deoxyribonucleic Acid Base Composition of the Yeastlike and Mycelial Phases of *Histoplasma capsulatum* and *Blastomyces dermatitidis*. ROGER E. BAWDON, ROBERT G. GARRISON, AND LOUIS R. FINA 593
Aminotransferase from a Deletion Mutant in the Histidine Operon. W. L. ALBRITTON AND ALFRED P. LEVIN 597
A Second Transport System for L-Arabinose in *Escherichia coli* B/r Controlled by the *araC* Gene. CANDICE E. BROWN AND ROBERT W. HOGG 606
Cell Division Mutations in the Blue-Green Bacterium *Agmenellum quadruplicatum* Strain BG1: a Comparison of the Cell Wall. L. O. INGRAM, C. VAN BAALEN AND W. D. FISHER 614
Mapping of a D-Cycloserine Resistance Locus in *Escherichia coli* K-12. R. R. B. RUSSELL 622

Physiology and Metabolism

Factors Affecting Hexose Phosphorylation in *Acetobacter xylinum*. MOSHE BENZIMAN AND B. RIVETZ 325
Mannitol Sensitivity. PAMELA JENSEN, CHARLOTTE PARKES, AND DAVID BERKOWITZ 351
Purification and Properties of Nicotinamide Adenine Dinucleotide-Dependent D- and

L-Lactate Dehydrogenases in a Group N Streptococcus. L. Mou, D. P. Mulvena, H. A. Jonas, and G. R. Jago 392
Factors Affecting the Activity of the Lactate Dehydrogenase of *Streptococcus cremoris*. H. A. Jonas, R. F. Anders, and G. R. Jago 397
Nature of the Receptor Substance of *Mycobacterium smegmatis* for D4 Bacteriophage Adsorption. Atsuko Furuchi and Tohru Tokunaga 404
Effect of Spermine on the Uptake of Amino Acids in *Micrococcus lysodeikticus*. Miriam Ariel and Nathan Grossowicz 412
Inhibition by 2-Deoxy-D-Glucose of Synthesis of Glycoprotein Enzymes by Protoplasts of *Saccharomyces*: Relation to Inhibition of Sugar Uptake and Metabolism. S.-C. Kuo and J. O. Lampen 419
Role of Iron and Sulfur in Pigment and Slime Formation by *Pseudomonas aeruginosa*. Samuel A. Palumbo 430
Spore Pool Glutamic Acid as a Metabolite in Germination. Harold F. Foerster 437
Cell Wall Alterations Associated with the Hyperproduction of Extracellular Enzymes in *Neurospora crassa*. Howard G. Gratzner 443
Evidence for a Phosphoenolpyruvate-Dependent Sugar Phosphotransferase in *Mycoplasma* Strain Y. P. J. Van Demark and P. Plackett 454
Production of an Autoinhibitor by a Thermophilic Bacillus. T. W. Chou, R. Greasham, S. R. Tannenbaum, and A. L. Demain 459
Inducible Uptake System for β-Carboxy-*cis*,*cis*-muconate in a Permeability Mutant of *Pseudomonas putida*. Richard B. Meagher, George M. McCorkle, M. K. Ornston, and L. N. Ornston 465
Isolation and Some Properties of Cell Envelope Altered Mutants of *Escherichia coli*. Claude Lazdunski and Bennett M. Shapiro 495
Relationship Between Permeability, Cell Division, and Murein Metabolism in a Mutant of *Escherichia coli*. Claude Lazdunski and Bennett M. Shapiro 499
Effect of Clycopentaneglycine on Metabolism in *Salmonella typhimurium*. J. Patrick O'Neill and Martin Freundlich 510
Effects of Fatty Acids on Growth and Envelope Proteins of *Bacillus subtilis*. Chingju W. Sheu and Ernst Freese 516
Effects of Acetate and Other Short-Chain Fatty Acids on Sugar and Amino Acid Uptake of *Bacillus subtilis*. Chingju W. Sheu, Wilhelmus N. Konings, and Ernst Freese 525
Isolation and Characterization of 2-Keto-3-Deoxyoctonate-Lipid A from a Heptose-Deficient Mutant of *Escherichia coli*. Seamus A. Rooney and Howard Goldfine 531
Response of the Intracellular Adenosine Triphosphate Pool of *Saccharomyces cerevisiae* to Growth Inhibition Induced by Excess L-Methionine. R. B. Bailey and L. W. Parks 542
Regulation of Homocysteine Biosynthesis in *Salmonella typhimurium*. Michael A. Savin, Martin Flavin, and Clarence Slaughter 547
Minimal Requirements for Commitment to Sporulation in *Bacillus megaterium*. Richard A. Greene and Ralph A. Slepecky 557
Appearance of Muramic Lactam During Cortex Synthesis in Sporulating Cultures of *Bacillus cereus* and *Bacillus megaterium*. Gary G. Wickus, Alan D. Warth, and Jack L. Strominger 625

Enzymology

Partial Characterization of Phosphoribosyl Transferase, Phosphoribosyl Anthranilate Isomerase, and Indole Glycerol Phosphate Synthase from *Serratia marcescens*. J. M. Potts and G. R. Drapeau 334
Superoxide Dismutase in *Bacillus popilliae*. Ralph N. Costilow and Bernard B. Keele, Jr. 628

Volume 111 Contents for September Number 3

Taxonomy and Ecology

Occurrence and Properties of Lactic Dehydrogenases of Fermentative Mycoplasmas. HAROLD NEIMARK AND RUTH M. LEMCKE 633
Allostery of 3-Deoxy-D-*arabino*-Heptulosonate 7-Phosphate Synthetase in *Clostridium*: Another Conserved Generic Characteristic. ROY A. JENSEN AND ROBERT TWAROG 641

Morphology and Ultrastructure

Interference-Contrast and Phase-Contrast Microscopy of Sporulation in *Clostridium thermosaccharolyticum* Grown Under Strict Anaerobiosis. CHARLES ELLER AND Z. JOHN ORDAL 674
Effects of Treatment with Sodium Dodecyl Sulfate on the Ultrastructure of *Escherichia coli*. C. L. WOLDRINGH AND WOUTERA VAN ITERSON 801
Purification of Sex Pili from *Escherichia coli* Carrying a Derepressed F-like R Factor. J. P. BEARD, T. G. B. HOWE, AND M. H. RICHMOND 814
Yeast Spheroplasts Formed by Cell Wall-Degrading Enzymes from *Oerskovia* sp. J. W. MANN, C. E. HEINTZ, AND J. D. MACMILLAN 821
Some Observations of Ascospores of *Neurospora Crassa* Made with a Scanning Electron Microscope. JEROME L. SULLIVAN, PAMELA C. WAGNER, AND A. GIB DEBUSK 825
Distribution of Alkaline Phosphatase Within the Periplasmic Space of Gram-Negative Bacteria. T. J. MACALISTER, J. W. COSTERTON, LINDA THOMPSON, J. THOMPSON, AND J. M. INGRAM 827
Influence of Nutrition on the Morphology of a Strain of *Bifidobacterium bifidum*. INTISAR HUSAIN, JAMES A. POUPARD, AND ROBERT F. NORRIS 841

Genetics and Molecular Biology

Isolation of Minicircular Deoxyribonucleic Acids from Wild Strains of *Escherichia coli* and their Relationship to other Bacterial Plasmids. WERNER GOEBEL AND HILDGUND SCHREMPF 696
Intergenotic Transformation of the *Bacillus subtilis* Genospecies. GARY A. WILSON AND FRANK E. YOUNG 705
Mutants with Altered Glucose Repression of Amidase Enzymes in *Aspergillus nidulans*. M. J. HYNES 717
Excision Repair Properties of Isogenic *rec*$^-$ Mutants of *Escherichia coli* K-12. DAVID M. SHLAES, JANET A. ANDERSON, AND STEPHEN D. BARBOUR 723
Regulation of Histidyl-Transfer Ribonucleic Acid Synthetase Formation in a Histidyl-Transfer Ribonucleic Acid Synthetase Mutant of *Salmonella typhimurium*. E. MCGINNIS AND L. S. WILLIAMS 739
3′,5′-Cyclic Adenosine Monophosphate-Requiring Mutants of *Escherichia coli*. YOSHINARI OHNISHI, LORENZO SILENGO, MICHIHIKO KUWANO, AND DAVID SCHLESSINGER 745
Effect of Thymine Limitation on Chromosomal Deoxyribonucleic Acid Synthesis in *Proteus mirabilis*. MARJORIE H. BARNES AND R. ROWND 750
Genetic Transfer of *Salmonella typhimurium* and *Escherichia coli* Lipopolysaccharide Antigens to *Escherichia coli* K-12. RANDALL T. JONES, DONALD E. KOELTZOW, AND B. A. D. STOCKER 758
Methionine Adenosyltransferase and Ethionine Resistance in *Saccharomyces cerevisiae*. JANET E. MERTZ AND K. D. SPENCE 778
Dark Dependence of Meiosis at Elevated Temperatures in the Basidiomycete *Coprinus lagopus*. BENJAMIN C. LU 833

Ribonuclease II Activity in a "Presumptive" Ribonuclease II-Deficient Mutant. STEPHEN C. WEATHERFORD, MICHEL WRIGHT, AND DAVID APIRION 835

Physiology and Metabolism

Biochemical and Genetic Aspects of Nystatin Resistance in *Saccharomyces cerevisiae*. MARTIN BARD 649
Death Through Respiratory Failure of a Fraction of Ultraviolet-Irradiated *Escherichia coli* B/r Cells. P. A. SWENSON AND R. L. SCHENLEY 658
Kinetics of Deoxyribonucleic Acid Destruction and Synthesis During Growth of *Bdellovibrio bacteriovorus* Strain 109D on *Pseudomonas putida* and *Escherichia coli*. ABDUL MATIN AND SYDNEY C. RITTENBERG 664
Photooxidative Death in Blue-Green Algae. A. ABELIOVICH AND M. SHILO 682
Identification of Two *Saccharomyces cerevisiae* Cell Wall Mannan Chemotypes. T. N. CAWLEY AND CLINTON E. BALLOU 690
Iron Uptake in *Salmonella typhimurium*: Utilization of Exogenous Siderochromes as Iron Carriers. MARY LUCKEY, JAY R. POLLACK, RUSH WAYNE, BRUCE N. AMES, AND J. B. NEILANDS 731
Effect of Maltose on Glucoamylase Formation by *Aspergillus niger*. LARRY L. BARTON, CARL E. GEORGI, AND DAVID R. LINEBACK 771
Changes in Activity of Glyoxylate Cycle Enzymes During Myxospore Development in *Myxococcus xanthus*. MICHAEL ORLOWSKI, PRESLEY MARTIN, DAVID WHITE, AND MICHAEL CHI-WAI WONG 784
Antibody-Mediated Modification of the Binding Properties of a Protein Related to Galactose Transport. BORIS ROTMAN AND JOHN H. ELLIS, JR. 791
Escherichia coli Mutants that Require Either Pyridoxine or Alanine. WALTER B. DEMPSEY 838

Enzymology

Amino Acid Sequence Around the Catalytic Site in Glyceraldehyde-3-Phosphate Dehydrogenase from *Bacillus stearothermophilus*. J. BRIDGEN, J. I. HARRIS, P. W. MCDONALD, R. E. AMELUNXEN, AND J. R. KIMMEL 797

MANUAL OF CLINICAL MICROBIOLOGY

Edited by JOHN E. BLAIR, Department of Microbiology, The Roosevelt Hospital, New York; EDWIN H. LENNETTE, Viral and Rickettsial Disease Laboratory, California Department of Public Health, Berkeley; and JOSEPH P. TRUANT, Department of Microbiology, Providence Hospital, Southfield, Michigan. With an expert editorial board of 16 members. *Regular edition: $12.00; Student edition, $7.00.* Members of the American Society for Microbiology may purchase copies of the regular edition at a discount of 50%, i.e., $6 per copy (postpaid) by writing directly to the ASM Publications Office, 1913 I Street, N.W., Washington, D.C., 20006.

This manual is designed to be used as a working reference guide in clinical microbiology for the teacher and technologist. It encompasses the fields of clinical bacteriology, mycology, serodiagnosis, virology, and parasitology. Currently accepted and proven methods are presented which permit the complete microbiological examination of clinical specimens. Procedures are given for the isolation and identification of the medically important bacteria, fungi, viruses, and parasites, with emphasis on those organisms which occur most frequently in infection in man, but with adequate consideration of the rarer forms. The manual contains 77 chapters, written by 100 contributors.

General sections describe the collection and processing of specimens, nutritive and environmental requirements of microorganisms, selection and inoculation of culture media for primary isolation, formulas of culture media, reagents and stains, staining procedures, microscopy, quality control, and safety precautions.

Contents By Section: General. Identification of Aerobic Bacteria. Identification of Anaerobic Bacteria. Antimicrobial Agents. Serodiagnosis of Bacterial and Spirochetal Infections. Identification of Fungi. Identification of Parasites. Identification of Viruses and Rickettsiae. Miscellaneous Procedures. Media, Procedures, Reagents, and Stains.

Published 1970

by the American Society for Microbiology

Distributed by:

THE WILLIAMS & WILKINS COMPANY
428 East Preston Street, Baltimore, Md. 21202

International Journal of Systematic Bacteriology

Volume 21 (4) October 1971

Absolutely essential to those who must keep abreast of the ever-changing field of bacterial systematics

EDITORIAL BOARD

Erwin F. Lessel, Editor; H. P. R. Seeliger; V. B. D. Skerman, Chairman

Designation of Type Strains for *Bifidobacterium* Species. G. REUTER 273

Deoxyribonucleic Acid Homology Relationships Among Species of the Genus *Bifidobacterium*. V. SCARDOVI, L. D. TROVATELLI, G. ZANI, F. CROCIANI, and D. MATTEUZZI 276

Theoretical Deoxyribonucleic Acid Homology Between Strains in *Rhizobium japonicum*. GERALD H. ELKAN and RICHARD A. USANIS 295

Eubacterium lentum (Eggerth) Prévot 1938: Emendation of Description and Designation of the Neotype Strain. W. E. C. MOORE, ELIZABETH P. CATO, and LILLIAN V. HOLDEMAN 299

Eubacterium contortum (Prévot) comb. nov.: Emendation of Description and Designation of the Type Strain. LILLIAN V. HOLDEMAN, ELIZABETH P. CATO, and W. E. C. MOORE 304

Eubacterium aerofaciens (Eggerth) Prévot 1938: Emendation of Description and Designation of the Neotype Strain. W. E. C. MOORE, ELIZABETH P. CATO, and LILLIAN V. HOLDEMAN 307

Transfer of *Sarcina* Goodsir from the Family *Micrococcaceae* Pribram to the Family *Peptococcaceae* Rogosa. MORRISON ROGOSA 311

Relationship of *Micrococcus* sp. ATCC 407 to the Status of *Micrococcus freudenreichii* Guillebeau. I. J. McDONALD 314

Serological Investigations of *Planococcus* Strains. PER OEDING 323

Streptomyces clavuligerus sp. nov., a β-Lactam Antibiotic Producer. C. E. HIGGENS and R. E. KASTNER 326

Taxonomy of the Chlamydiae: Reasons for Classifying Organisms of the Genus *Chlamydia*, Family *Chlamydiaceae*, in a Separate Order, *Chlamydiales* ord. nov. JOHANNES STORZ and LESLIE A. PAGE 332

Published Quarterly

ASM Publications Office
1913 I St., N.W.,
Washington, D.C. 20006

Please enter my subscription to the INTERNATIONAL JOURNAL OF SYSTEMATIC BACTERIOLOGY.

Check one:

_____Institution ($12)

_____Personal ($8)

Name _____

Address _____

City/State/Zip _____

AUTHOR INDEX

VOLUME 111

Abeliovich, A., 682
Adams, Bruce G., 308
Adelberg, Edward A., 119
Albritton, W. L., 597
Amelunxen, R. E., 797
Ames, Bruce N., 731
Anders, R. F., 397
Anderson, Janet A., 723
Anderson, Thomas F., 177
Apirion, David, 835
Ariel, Miriam, 412

Bailey, R. B., 542
Baldwin, J. N., 152
Ballou, Clinton E., 690
Barbour, Stephen D., 723
Bard, Martin, 649
Barnes, Marjorie H., 750
Barrow-Carraway, Joyce, 15
Barton, Larry L., 771
Bawdon, Roger E., 593
Beard, J. P., 814
Benziman, Moshe, 325
Bergquist, Peter L., 119
Berkowitz, David, 351
Bernlohr, R. W., 94
Bickle, Thomas A., 474
Birch-Andersen, A., 254
Black, F. T., 254
Boatman, Edwin S., 267
Boylen, C. W., 103
Brady, James M., 56
Bridgen, J., 797
Brill, Winston J., 375
Brinson, Karen R., 56
Brock, Thomas D., 343
Brown, Candice E., 606

Canale-Parola, E., 86
Cawley, T. N., 690
Chandler, Jerry LR., 98
Chatterjee, Anadi N., 220, 272
Chatterjee, Arun K., 169
Chou, T. W., 459
Cirigliano, C., 488
Costerton, J. W., 827
Costilow, Ralph N., 628
Craig, E., 66
Crawford, Irving P., 163
Curtiss, Roy III, 264

D'Aoust, J. Y., 340
DeBusk, A. Gib, 825
Demain, A. L., 459
Dempsey, Walter B., 838
Dhir, Sanittar P., 267
Doi, Roy H., 248
Doolittle, W. Ford, 316
Douglass, Stephen A., 481
Drapeau, G. R., 334
Dubnau, D., 488

Egan, J. Barry, 303
Eleuterio, Marianne, 383
Eller, Charles, 674
Ellis, John H., Jr., 791
Engelbrecht, Helen L., 33

Fina, Louis R., 593
Firth, Anne, 24
Fisher, W. D., 614
Flavin, Martin, 547
Fliermans, Carl B., 343
Foerster, Harold F., 437
Freese, Ernst, 516, 525
Freundlich, Martin, 510
Freundt, E. A., 254
Furuchi, Atsuko, 404

Ganesan, Ann K., 575
Garrison, Robert G., 593
Georgi, Carl E., 771
Gholson, R. K., 98
Gibbins, Ann M., 129
Gilpin, Richard W., 272
Goebel, Werner, 696
Goldfine, Howard, 531
Goldthwait, David A., 447
Good, C. M., 231
Goodman, E. M., 242
Gratzner, Howard G., 443
Greasham, R., 459
Greene, Richard A., 557
Gregory, K. F., 129
Griffin, Barbara, 383
Grossowicz, Nathan, 412
Gurgo, C., 66
Gutnick, David L., 287

Harris, J. I., 797
Hayes, W., 80
Heintz, C. E., 821
Heinzman, Michael W., 56
Hoffee, Patricia, 296
Hogg, Robert W., 606
Holmes, R. P., 290
Howe, T. G. B., 814
Husain, Intisar, 841
Hynes, M. J., 717

Igarashi, Kazuei, 1
Ingram, J. M., 827
Ingram, L. O., 112, 614
Iyer, V. N., 7

Jacobson, Lewis A., 142
Jago, G. R., 392, 397
Jargiello, Patricia, 296
Jensen, Pamela, 351
Jensen, Roy A., 112, 641
Jonas, H. A., 392, 397
Jones, Randall T., 758

Kane, James F., 112
Kanner, Baruch I., 287
Karamata, D., 73
Keele, Bernard B., Jr., 628
Kelley, Philip, 586
Kimmel, J. R., 797
Kirby, Edward P., 447
Koeltzow, Donald E., 758
Konings, Wilhelmus N., 525
Kostiw, Luba L., 103
Kuo, S.-C., 419
Kushner, D. J., 340
Kuwano, Michihiko, 745

Lampen, J. O., 419
Lazdunski, Claude, 495, 499
Leder, Irwin G., 211
Leighton, Terrance J., 248
Lemcke, Ruth M., 633
Leonard, Thomas J., 292
Levin, Alfred P., 597
Lin, E. C. C., 566
Lineback, David R., 771
Lu, Benjamin C., 833
Luckey, Mary, 731

MacAlister, T. J., 827
McConnell, M., 73
McCorkle, George M., 465
McDonald, P. W., 797
McGinnis, E., 739
Macmillan, J. D., 821
Mann, J. W., 821
Martin, Presley, 784
Martini, Alessandro, 481
Matin, Abdul, 664
Matsuzaki, Kazuyoshi, 1
Meagher, Richard B., 465
Mendelson, Neil H., 156, 298
Mertz, Janet E., 778
Milewskiy, Marianne, 586
Mills, Stanley E., 163
Modi, V. V., 356
Moody, Eric E. M., 80
Morris, Howard, 203
Mou, L., 392
Mulvena, D. P., 392
Munakata, Nobuo, 192

Neilands, J. B., 731
Neimark, Harold, 633
Newell, Sara Lee, 375
Norris, Robert F., 841

Ohnishi, Yoshinari, 745
O'Neill, J. Patrick, 510
Ordal, Z. John, 674
Orlowski, Michael, 784
Ornston, L. N., 465
Ornston, M. K., 465
Ou, Jonathan T., 177

Palumbo, Samuel A., 430
Parkes, Charlotte, 351
Parks, L. W., 542
Pelroy, R. A., 47
Pène, Jacques J., 15
Peterson, D. E., 94
Phaff, Herman J., 481
Pierson, Duane, 112
Pinney, R. J., 361
Plackett, P., 454
Pollack, Jay R., 731
Potts, J. M., 334
Poupard, James A., 841

Raina, J. L., 356
Randolph, M. L., 186
Reiter, Harvard, 586
Richmond, M. H., 814
Rittenberg, Sydney C., 664
Rivetz, B., 325
Rocha, Victor, 163
Rogers, H. J., 73
Rogers, S. W., 94
Rooney, Seamus A., 531
Rosenthal, R. S., 260
Rotman, Boris, 791
Rownd, R., 759
Ruff, W. L., 447
Rupert, Claud S., 192
Ruscetti, Francis W., 142
Russell, R. R. B., 290, 622
Russell, S. E., 7

Santo, Leatrice, 248
Savin, Michael A., 547
Schenley, R. L., 658
Schlegel, Richard, 199
Schlesinger, Milton J., 203
Schlessinger, D., 66
Schlessinger, David, 745
Schrempf, Hildgund, 696
Setlow, Jane K., 186
Shafia, Fred, 56
Shapiro, Bennett M., 495, 499
Sheppard, David E., 383
Sheu, Chingju W., 516, 525
Shilo, M., 682
Shlaes, David M., 723
Silengo, Lorenzo, 745
Slade, Hutton D., 199
Slaughter, Clarence, 547
Slepecky, Ralph A., 557
Smith, J. T., 361
Smith, Kendric C., 575
Solomon, E., 566
Sonstein, Stephen A., 152
Spence, K. D., 778
Stahly, D. P., 94
Stallions, Donald R., 294
Starr, Mortimer P., 169
Stocker, B. A. D., 758
Strominger, Jack L., 625
Stuttard, C., 368
Sullivan, Jerome L., 825
Sun, Yung-Tien, 474
Sundaram, T. K., 284
Swenson, P. A., 658

Takeda, Yoshifumi, 1
Tannenbaum, S. R., 459
Thompson, J., 827
Thompson, Linda, 827
Tipper, D. J., 231
Tokunaga, Tohru, 404
Traut, Robert R., 474
Twarog, Robert, 37, 641
Tyson, B. J., 103

Uffen, Robert L., 86

Van Baalen, C., 112, 614
Van Demark, P. J., 454
van Iterson, Woutera, 801
Vela, G. R., 260

Wagner, Pamela C., 825
Warth, Alan D., 625
Wayne, Rush, 731
Weatherford, Stephen C., 835
White, David, 784
Whiteley, H. R., 47
Wickus, Gary G., 625
Williams, L. S., 739
Wilson, Gary A., 705
Wimpenny, Julian W. T., 24
Woldringh, C. L., 801
Wong, Michael Chi-Wai, 784
Woods, Walter H., 303
Wright, Michel, 835

Young, Frank E., 220, 272, 705

SUBJECT INDEX

VOLUME 111

Acetate
  sugar and amino acid uptake inhibition, 525
Acetobacter xylinum
  hexose phosphorylation, 325
Acetyl coenzyme A
  V. alcalescens, 47
N-Acetylglucosamine
  metabolism mutations, 290
Acholeplasma axanthum
  lactic dehydrogenase, 633
Acholeplamsa laidlawii
  lactic dehydrogenase, 633
Acinetobacter
  isoleucine-valine pathway regulation, 37
Adenosine monophosphate
  cyclic, 745
Adenosine triphosphate
  B. subtilis, 516, 525
  depletion by growth on methionine, 542
  fatty acid inhibition of, 516, 525
  S. cerevisiae, 542
  synthesis deficiency, 287
S-Adenosylmethionine
  depletion of ATP pool, 542
  homocysteine regulation, 547
  regulation of, 778
Aerobacter aerogenes
  myo-inositol catabolism, 284
Aerobiosis
  NAD(H) levels, 24
Agmenellum quadruplicatum
  cell division mutants, 614
  peptidoglycan alterations, 614
  tryptophan auxotroph, 112
Agrobacterium
  nucleic acid hybridization, 129
  species relatedness, 129
Albomycin δ_2
  S. typhimurium resistance, 731
Alkaline phosphatase
  periplasmic, 827
  proline analogues in formation of, 203
Allostery
  of DAHP synthetase control, 641
Amidase
  glucose repression of, 717
Amino sugars
  metabolism mutations, 290
Aminotransferase
  structure and maturation, 597
Anacystis nidulans
  photooxidative death, 682
  rRNA synthesis and maturation, 316
Anaerobiosis
  NAD(H) levels, 24
Antibodies
  modification of galactose-binding protein, 791
L-Arabinose
  binding protein, 606
Arabinose operator region
  polar mutations adjacent to, 383
Arabinose operon
  initiation of expression, 383
Arthrobacter crystallopoietes
  lipid composition, 103
  starvation of, 103
Ascospores
  N. crassa, 825
Aspergillus nidulans
  amidase synthesis mutations, 717
Aspergillus niger
  glucoamylase formation, 771
Autoinhibitor
  isolation from thermophilic bacillus, 459
Autolysis
  cell division mutant of *E. coli*, 499
  salt-activated, 272
  S. aureus, 272
Azotobacter
  pleomorphism induced by peptone, 260
Azotobacter vinelandii
  ribosomal proteins, 474

Bacillus cereus
  lysine pathway, 94
  sporulation, 33, 94, 625
Bacillus licheniformis
  spore germination, 437
Bacillus megaterium
  commitment to sporulation, 557
  spore germination, 437
  sporulation, 625
Bacillus popilliae
  superoxide dismutase, 628
Bacillus sp. F4A
  autoinhibitor, 459
Bacillus stearothermophilus
  glyceraldehyde-3-phosphate dehydrogenase
    active site, 797
  ribosomal proteins, 474
Bacillus subtilis
  cell membrane alteration, 516, 525
  division site regulation, 298
  DNA degradation by phleomycin, 586
  DNA distribution and cell elongation, 156
  growth inhibition by fatty acids, 516
  intergenotic transformation, 705
  pulcherriminic acid synthesis, 86
  purine nucleoside phosphorylase, 33
  ribosomal proteins, 474
  RNA synthesis initiation, 15
  rod mutants, 73
  serine protease mutant, 248
  spore photoproduct, 192

sporulation, 248
transforming DNA fate, 488
Bacteriophage 186
integration site, 303
Bacteriophage 2C
initiation of RNA synthesis, 15
Bacteriophage D4
receptor substance for, 404
Bacteriophage lambda
initiation of RNA synthesis, 15
Bacteriophage M13
carrier state, 7
R factor elimination, 7
Bacteriophage T4
initiation of RNA synthesis, 15
Bacteriophage ϕ29
initiation of RNA synthesis, 15
Bdellovibrio bacteriovorus
DNA degradation and synthesis, 664
Bifidobacterium bifidum
morphology and nutritional requirements, 841
Blastomyces dermatitidis
GC content, 593
Blue-green algae
photooxidative death, 682
Blue-green bacteria
isolation of stable auxotroph, 112
peptidoglycan alterations, 614

Caffeine
prevention of DNA repair, 658
β-Carboxymuconate
permeability to, 465
Catabolite repression
insensitivity to, 375
Cell division
A. quadruplicatum filamentous mutants, 614
B. subtilis, 298
E. coli, 447, 499
furan effects, 447
murein altered mutant, 499
site regulation, 298
Cell membrane
B. subtilis, 516, 525
E. coli, 211, 495
fatty acid effects on, 516, 525
M. lysodeikticus, 412
permeability, 211
permeability mutants, 495
spermine effects, 412
Cell wall
A. quadruplicatum mutants, 614
autolysis, 272, 499
galactosamine to glucosamine ratio, 443
mannan types in yeast, 690
N. crassa, 443
S. aureus, 220, 231, 272
synthesis defects, 220, 231
Chlamydia psittaci
polysaccharide antigen location, 267
staining technique, 267
Chromosome transfer
F-*gal*, 119
Clostridium
pattern of DAHP synthetase control, 641
Clostridium acetobutylicum
allosteric control of DAHP synthetase, 641
Clostridium butyricum
allosteric control of DAHP synthetase, 641
Clostridium tetanomorphum
allosteric control of DAHP synthetase, 641
Clostridium thermosaccharolyticum
sporulation sequence, 674
Clostridium welchii
NAD(H) levels, 24
Colicinogenic factors
chromosome transfer, 80
Conjugation
anaerobic, 294
E. coli, 177, 294
zinc effects on, 177
Coprinus lagopus
meiosis in light and dark, 833
Cyclic adenosine monophosphate
requirement for, 745
Cyclopentaneglycine
growth inhibition of *S. typhimurium*, 510
D-Cycloserine
resistance locus in *E. coli*, 622

deo genes
order of, 296
3-Deoxy-D-*arabino*-heptulosonate 7-phosphate synthetase
control pattern in *Clostridium* spp., 641
2-Deoxy-D-glucose
inhibition of sugar metabolism, 419
Deoxyribonucleic acid
B. bacteriovorus, 664
binding and transformation, 356
B. subtilis, 156, 192, 488, 586, 705
degradation by phleomycin, 586
degradation in bdellovibrio growth, 664
distribution along cell length, 156
E. coli, 664, 696
GC content of *B. dermatitidis*, 593
GC content of *H. capsulatum*, 593
GC content of *Kluyveromyces* spp., 481
H. influenzae, 186
intergenotic transformation, 705
minicircular, 696
plasmid isolation, 696
P. mirabilis, 750
P. putida, 664
rec-dependent repair, 575
R. japonicum, 356
sonic radiation damage, 186
spore photoproduct, 192
synthesis in bdellovibrio growth, 664
thymine limitation effects, 750
transformation product, 488
tranforming, 186
Deoxyribonucleic acid-deoxyribonucleic hybridization
Agrobacterium spp., 129
Rhizobium spp., 129
Deoxyribonucleic acid-ribonucleic acid hybridization
Agrobacterium spp., 129
Rhizobium, spp., 129

Electron transport
cell membrane, 516, 525
fatty acid effects on, 516, 525
Enterobacter aerogenes
tryptophan synthetase β_2 subunit, 163
Episomes
F'*lac*, 169
Erwinia spp.
transfer of F'*lac* to, 169
Escherichia coli
alanine-requiring, 838
alkaline phosphatase formation, 203
alkaline phosphatase, periplasmic, 827
amino sugar metabolism genes, 290
arabinose transport, 606
ara operon, 383
ATP synthesis deficiency, 287
autolysis, 499
cAMP-requiring mutant, 745
cell division, 499
cell membrane permeability, 211, 495
conjugation, 177, 294
cycloserine resistance locus, 622
DNA during bdellovibrio growth, 664
excision repair, 723
F-*gal* transfer, 119
F'*lac* transfer to *Erwinia*, 169
galactose-binding protein, 791
genetic groups, 838
hybrid with *Salmonella*, 758
KDO-lipid A, 531
lipopolysaccharide antigen genes, 758
mannitol enzymes, 566
M13 carrier state, 7
mglP transport system, 791
murein altered division mutant, 499
NAD(H) levels, 24
nad mutants, 98
neomycin-resistant mutant, 287
permeability mutants, 495
permease accumulated substrates, 211
plasma membrane, 801
plasmid isolation, 696
prophage induction, 447
prophage 186 integration site, 303
pyridoxineless, 838
rec-dependent repair, 575
rec mutants, 723
recombination system, 80
respiratory failure, 658
R factor 1818, 361
R factor loss, 7
rfa, *rfb*, 758
ribonuclease II deficiency, 835
ribosomal proteins, 474
ribosome accumulation, 142
rRNA synthesis by stringent strain, 66
SDS effects on ultrastructure, 801
sex pili, 814
thymine starvation, 361
tryptophan synthetase β_2 subunit, 163
UV irradiation of, 575, 658
uvr mutants, 723
zinc effects on conjugation, 177

Ethionine
resistance to, 778
Excision
abnormal, 119
Excision repair
assay for, 723
rec mutants, 723
Extracellular enzymes
hyperproduction by *N. crassa*, 443

Fatty acids
inhibition of *B. subtilis*, 516, 525
Ferrobacillus ferrooxidans
conversion to organotrophy, 56
F'*lac*
transfer to *Erwinia* spp., 169
Fluorouracil
respiratory maintenance by, 658
Fructokinase
A. xylinum, 325
Fructose
phosphorylation, 325
Fructose diphosphate
lactate dehydrogenase activation, 397
Furan derivatives
prophage induction, 447

Galactokinase
glucose repression, 308
induction in *S. cerevisiae*, 308
Galactosamine
N. crassa cell wall, 443
Galactose-binding protein
modification by antibodies, 791
Glucoamylase
A. niger, 771
maltose-stimulated formation, 771
Glucokinase
A. xylinum, 325
Glucose
amidase repression by, 717
phosphorylation, 325
Glutamic acid
spore germination role, 437
Glyceraldehyde-3-phosphate dehydrogenase
amino acid sequence of active site, 797
Glycine
pleomorphism induction in *Azotobacter*, 260
Glycoprotein
synthesis inhibition in yeast, 419
Glyoxylate cycle
M. xanthus myxospore development, 784
Guanine plus cytosine content
B. dermatitidis, 593
H. capsulatum, 593
Kluyveromyces spp., 481

Haemophilus influenzae
DNA, 186
transformation inhibition by sonic treatment, 186
Hansenula anomala
spheroplast formation, 821
Histidyl-transfer ribonucleic acid synthetase
control of, 739

Histoplasma capsulatum
GC content, 593
Homocysteine
synthesis regulation, 547

Immunoglobin
modification of galactose-binding protein, 791
Indole glycerol phosphate synthase
S. marcescens, 334
myo-Inositol
catabolism by *A. aerogenes*, 284
Intergenote
defined, 705
Iron
pigment inhibition in *P. aeruginosa*, 430
siderochrome-mediated uptake, 731
Isocitrate lyase
M. xanthus, 784
Isoleucine
synthesis regulation in *Acinetobacter*, 37

Karyogamy
C. lagopus, 833
β-Ketoadipate pathway
mutant permeable to intermediates of, 465
2-Keto-3-deoxyoctonate-lipid A
isolation from heptose-deficient mutant, 531
Klebsiella aerogenes
NAD(H) levels, 24
Kloeckera brevis
cell wall mannan chemotypes, 690
flocculation, 690
Kluyveromyces spp.
GC contents, 481

Lactate dehydrogenase
FDP-activated, 397
group N streptococcus, 397
mycoplasma species, 633
NAD-dependent, 392, 397
S. cremoris, 397
Lipid A
E. coli, 531
Lipopolysaccharide antigen
gene transfer to *E. coli* K-12, 758
Lysine
synthesis during *B. cereus* sporulation, 94

Magnesium
stimulation of aminoacyl tRNA formation, 1
Malate synthase
M. xanthus, 784
Maltose
glucoamylase stimulation by, 771
Mannan
chemotypes in yeast cell wall, 690
Mannitol
enzyme mutants, 566
sensitivity in *S. typhimurium*, 351
Marine pseudomonad B16
periplasmic alkaline phosphatase, 827
Meiosis
C. lagopus, 833
temperature-sensitive, dark-dependent, 833
Messenger ribonucleic acid
monosome accumulation requirement, 142
synthesis by stringent cells, 66
Methionine
depletion of ATP pool, 542
synthesis regulation, 547
Methionine adenosyltransferase
repression of, 778
mglP transport system, 791
Micrococcus luteus
ribosomal proteins, 474
Micrococcus lysodeikticus
amino acid uptake inhibition, 412
Muramic lactam
synthesis during sporulation, 625
Mycobacterium phlei
ribosomal proteins, 474
Mycobacterium smegmatis
mycoside C characterization, 404
phage D4 receptor substance, 404
Mycoplasma fermentans,
lactic dehydrogenase, 633
Mycoplasma gallisepticum
lactic dehydrogenase, 633
Mycoplasma mycoides var. *mycoides*
lactic dehydrogenase, 633
Mycoplasma neurolyticum
lactic dehydrogenase, 633
Mycoplasma pneumoniae
lactic dehydrogenase, 633
Mycoplasma strain Y
PEP-phosphotransferase, 454
Mycoplasma, T strain
morphology and ultrastructure, 254
Mycoplasma UM 30847
lactic dehydrogenase, 633
Mycoside C
purification from *M. smegmatis*, 404
Myxamoebae
axenic culture of, 242
Myxococcus xanthus
myxospore development, 784
Myxospores
glyoxylate cycle enzymes, 784

Neomycin
resistant *E. coli* mutants, 287
Neurospora crassa
ascospore morphology, 825
cell wall alteration, 443
extracellular enzyme production, 443
Nicotinamide adenine dinucleotide
assay for, 24
levels in facultative bacteria, 24
synthesis by *E. coli*, 98
Nystatin
resistance in yeast, 649

Oerskovia
yeast spheroplast formation by enzyme from, 821
Organotrophy
conversion to, from chemolithotrophy, 56

Penicillinase plasmid
elimination by surface-active agents, 152
S. aureus, 152
Peptidoglycan
defective synthesis, 220, 231
Peptone
pleomorphism induction in *Azotobacter*, 260
Permeability
increased, 499
to β-carboxymuconate, 465
to lactose, 495
Permease
accumulated substrates, 211
cold shock effects on, 211
osmotic pressure effects on, 211
Phenoloxidase
S. commune sporocarp formation, 292
Phleomycin
DNA degradation, 586
Phosphoenolpyruvate-phosphotransferase
Mycoplasma strain Y, 454
Phosphoribosyl anthranilate isomerase
S. marcescens, 334
Phosphoribosyl transferase
S. marcescens, 334
Phosphorylation
fructose, 325
glucose, 325
Phosphotransacetylase
kinetic properties, 47
V. alcalescens, 47
Photooxidative death
of blue-green algae, 682
Physarum polycephalum
culture of myxamoebae, 242
Plasma membrane
SDS disruption, 801
Plasmids
chromosome transfer, 80
ColE1, ColV, 696
isolation from *E. coli* 15, 696
λdg, 696
Polyamines
amino acid uptake inhibition, 412
stimulation of aminoacyl tRNA formation, 1
Polysaccharide
synthesis inhibition in yeast, 419
Proline
catabolism regulation, 375
Prophage induction
effector molecule, 447
Protein synthesis
required for DNA repair, 575
Proteus mirabilis
thymine limitation effects, 750
Proteus vulgaris
ribosomal proteins, 474
Pseudomonad, marine
periplasmic alkaline phosphatase, 827
Pseudomonas aeruginosa
NAD(H) levels, 24
pigment formation inhibition, 430
Pseudomonas putida
DNA during bdellovibrio growth, 664
permeability to β-carboxymuconate, 465
Pseudomonas testosteroni
ribosomal proteins, 474
Psychrophilic marine bacterium NRC 1004
Vibrio psychroerythrus sp. n., 340
Pulcherriminic acid
synthesis in *B. subtilis*, 86
Purine nucleoside phosphorylase
sporulating *B. cereus*, 33
Pyocyanine
synthesis inhibition by Fe and S, 430
Pyridoxal phosphate
incorporation in mutant aminotransferase, 597
Pyridoxine
lack of in *E. coli* mutants, 838

Quinolinic acid
excretion by *nad* mutants, 98

rec mutants
thymine dimer excision, 723
UV sensitivity, 723
Recombination system
role in plasmid chromosome transfer, 80
Respiration
defective coupling to ATP synthesis, 287
Respiratory failure
prevention by fluorouracil, 658
R factor 1818
elimination affected by thymine, 361
R factors
chromosome transfer, 80
elimination by M13, 7
Rhizobium
nucleic acid hybridization, 129
species relatedness, 129
Rhizobium japonicum
DNA binding and transformation, 356
Ribonuclease II
presumptive deficiency in *E. coli* mutant, 835
Ribonucleic acid
A. nidulans, 316
B. subtilis, 7
E. coli, 66, 142
messenger, 66, 142
ribosomal, 66, 316
S. typhimurium, 739
synthesis initiation, 15
transfer, 1
transfer, histidyl-, 739
Ribonucleic acid polymerase
inhibition of, 15
Ribosomal proteins
similarities among prokaryotes, 474
Ribosomal ribonucleic acid
A. nidulans, 316
E. coli, 66
preparation technique, 316
synthesis during amino acid starvation, 66
Ribosomes
accumulation after energy shift-down, 142
rod mutants
mapping of, 73
salt-dependent, 73

Saccharomyces
sugar uptake inhibition, 419
Saccharomyces cerevisiae
cell wall mannans, 690
ethionine resistance, 778
flocculation, 690
galactokinase induction, 308
inhibition by methionine, 542
nystatin resistance, 649
petite phenotype, 649
spheroplast formation, 821
sterol content, 649
Salmonella typhimurium
acetate incorporation, 351
albomycin resistance, 731
aminotransferase mutant, 597
catabolite repression-insensitive mutants, 375
deo mapping, 296
histidyl-tRNA synthetase, 739
homocysteine regulation, 547
hybrid with *E. coli*, 758
iron uptake mutants, 731
isoleucine pathway, 510
lipopolysaccharide antigen genes, 758
mannitol sensitivity, 351
methionine regulation, 547
proline catabolic enzyme regulation, 375
rfa, *rfb*, 758
ribosomal proteins, 474
siderochrome utilization, 731
trpR location, 368
tryptophan synthetase β_2 subunit, 163
Schizophyllum commune
phenoloxidase activity, 292
sporocarp development, 292
Serratia marcescens
tryptophan pathway enzymes, 334
tryptophan synthetase β_2 subunit, 163
Sex factors
chromosome transfer, 80
Sex pili
isolation, 814
Shigella dysenteriae
tryptophan synthetase β_2 subunit, 163
Siderochromes
utilization by *S. typhimurium*, 731
Sodium chloride
autolysis activation, 272
Sodium dodecyl sulfate
effect on *E. coli* ultrastructure, 801
elimination of penicillinase plasmid, 152
Sonic radiation
inactivation of transforming DNA, 186
Spermine
amino acid uptake inhibition, 412
stimulation of aminoacyl tRNA formation, 1
Spheroplasts
formation due to *Oerskovia* enzymes, 821
Spore photoproduct
genetic control of, 192
Spores
B. licheniformis, 437
B. megaterium, 437
B. subtilis, 192
germination, 437
glutamic acid pool, 437
UV sensitivity, 192
Sporocarps
S. commune, 292
Sporulation
B. cereus, 33, 94, 625
B. megaterium, 557, 625
B. subtilis, 248
commitment requirements, 557
C. thermosaccharolyticum, 674
heat resistance, 33
lysine synthesis during, 94
muramic lactam appearance, 625
purine nucleoside phosphorylase occurrence, 33
Staphylococcus albus
NAD(H) levels, 24
Staphylococcus aureus
autolysis activated by salt, 272
penicillinase plasmid elimination, 152
peptidoglycan mutants, 220, 231
Sterols
requirement in nystatin-resistant yeast, 649
Streptococci, group N
NAD-dependent lactate dehydrogenases, 392
Streptococcus
transformation rate, 199
Streptococcus cremoris
lactate dehydrogenase, 397
Sulfolobus acidocaldarius
in hot acid soils, 343
Sulfur
pigment inhibition in *P. aeruginosa*, 430
Sulfuric acid
production by bacteria, 343
Sulfur-oxidizing bacteria
ecology and distribution, 343
Superoxide dismutase
B. popilliae, 628
Surface-active agents
elimination of penicillinase plasmid, 152
Synechococcus cedrorum
photooxidative death, 682

Thiobacillus thiooxidans
in hot acid soils, 343
Thymine
limitation effects on *P. mirabilis*, 750
R factor elimination effects, 361
Thymine dimers
assay for excision of, 723
T mycoplasmas
morphology and ultrastructure, 254
Transfer ribonucleic acid
aminoacylation requirements, 1
histidyl-, 739
S. typhimurium, 739
Transfer ribonucleic acid synthetase
histidyl-, 739
Transformation
B. subtilis, 705
heterologous, 705
H. influenzae, 186
inhibition by sonic radiation, 186
intergenotic, 705

rate of, 199
R. japonicum, 356
size and distribution of donor DNA, 488
streptococcal, 199
Transport
galactose, 791
Tryptophan
A. quadruplicatum auxotroph, 112
pathway enzymes of *S. marcescens*, 334
regulatory genes in *S. typhimurium*, 368
Tryptophan synthetase
β_2 subunit properties, 163

Ultraviolet light
repair after irradiation, 575
respiratory failure induced by, 658
sensitive *B. subtilis* spores, 192
uvr mutants
thymine dimer excision, 723

Valine
synthesis regulation in *Acinetobacter*, 37
Veillonella alcalescens
phosphotransacetylase, 47
Vibrio psychroerythrus sp. n.
characterization, 340

X-rays
repair after irradiation, 575

Yeast
spheroplast formation, 821

Zinc
inhibition of mating pair formation, 177

INDEX TO DATE OF ISSUE

Month	Date of Issue	Pages
July	13 July 1972	1-302
August	11 August 1972	303-632
September	5 September 1972	633-848

JOURNAL

OF

BACTERIOLOGY

VOLUME 112

BALTIMORE, MD. 21202

1972

JOURNAL OF BACTERIOLOGY

VOLUME 112

EDITORIAL BOARD

L. LEON CAMPBELL, Editor-in-Chief (1975)
University of Delaware, Newark

R. L. ANDERSON, Editor (1975)
Michigan State University, East Lansing

ROY CURTISS III, Editor (1974)
University of Alabama, Birmingham

S. G. BRADLEY, Editor (1974)
Virginia Commonwealth University, Richmond

ALLEN G. MARR, Editor (1973)
University of California, Davis

H. E. UMBARGER, Editor (1976)
Purdue University, Lafayette, Ind.

Martin Alexander (1972)
W. Lane Barksdale (1972)
M. E. Bayer (1972)
Blaine Beaman (1976)
Claire M. Berg (1973)
Richard S. Berk (1974)
Robert W. Bernlohr (1973)
Allan Campbell (1972)
B. Wesley Catlin (1974)
D. Joseph Clark (1974)
Royston C. Clowes (1972)
V. W. Cochrane (1972)
Stanley N. Cohen (1973)
Ronald S. Cole (1974)
S. F. Conti (1972)
John A. DeMoss (1972)
Walter J. Dobrogosz (1973)
Martin Dworkin (1973)
R. G. Eagon (1974)
Alan D. Elbein (1973)
Wolfgang Epstein (1974)
Herman Friedman (1972)
A. T. Ganesan (1972)
Howard Goldfine (1972)
Joseph S. Gots (1972)
Harlyn O. Halvorson (1972)
F. M. Harold (1973)
Leonard Hayflick (1972)
George Hegeman (1974)
Charles E. Helmstetter (1972)
Robert K. Herman (1974)
Joseph T. Holden (1972)
John G. Holt (1972)
Stanley C. Holt (1974)
John Ingraham (1973)
Sam Kaplan (1974)
David E. Kennell (1974)
Robert L. Lester (1975)
Hillel S. Levinson (1972)
W. R. Lockhart (1972)
Manley Mandel (1972)
David Mardon (1974)
Paul Margolin (1972)
Alvin Markovitz (1973)
M. L. Morse (1972)
Richard P. Novick (1973)
Leo Parks (1973)
H. J. Phaff (1972)
Allen T. Phillips (1973)
Jack Preiss (1974)
Charles C. Remsen III (1973)
William S. Reznikoff (1973)
H. V. Rickenberg (1973)
Antonio H. Romano (1973)
John Roth (1973)
Harold L. Sadoff (1974)
M. R. J. Salton (1972)
David Schlessinger (1974)
Carl Schnaitman (1974)
Stanley K. Shapiro (1976)
Simon Silver (1973)
W. R. Sistrom (1972)
Lucile Smith (1972)
Bernard S. Strauss (1972)
Noboru Sueoka (1972)
Paul S. Sypherd (1974)
A. L. Taylor (1974)
Arthur Weissbach (1974)
N. E. Welker (1973)
R. W. Wheat (1972)
Helen R. Whiteley (1972)
Meyer J. Wolin (1973)
Frank E. Young (1973)
Stanley A. Zahler (1974)

ROBERT A. DAY, *Managing Editor, 1913 I St., N.W., Washington, D.C. 20006*

EX OFFICIO

R. G. E. MURRAY, President (1972–1973)
DONALD E. SHAY, Secretary

L. LEON CAMPBELL, Vice-President (1972–1973)
T. J. CARSKI, Treasurer

The *Journal of Bacteriology*, a publication of the American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006, is devoted to the advancement and dissemination of fundamental knowledge concerning bacteria and other microorganisms. The *Journal* is published monthly, and the twelve numbers are divided into four volumes per year. The subscription price is $75 (Postal Union Countries, $77: other foreign, $78) per year. Single copies are $7.00 (foreign, 7.25). Members of the American Society for Microbiology may receive the *Journal* as part of their dues. Correspondence relating to subscriptions, reprints, defective copies, availability of back issues, lost or late proofs, disposition of submitted manuscripts, and general editorial matters should be directed to the ASM Publications Office. 1913 I St., N.W., Washington, D.C. 20006 (area 202 833-9416). Correspondence from ASM members relating to membership dues, member subscriptions, changes of address, incorrect journals, etc., should be directed to the Executive Secretary, American Society for Microbiology, 1913 I St., N.W., Washington, D.C. 20006. Published monthly by the ASM at 428 E. Preston St., Baltimore, Md. 21202.

Second class postage paid at Baltimore, Md. 21202, and at additional mailing offices.
Made in the United States of America.
Copyright © 1972, American Society for Microbiology.
All Rights Reserved.

Volume 112

Contents for October

Number 1

Taxonomy and Ecology

A 3,5-Diaminohexanoate-Decomposing *Brevibacterium*. Su-chen L. Hong and H. A. Barker 231

Morphology and Ultrastructure

Reversion of Ribosomal Helix Formation in *Escherichia coli*. David J. Silverman and Herbert Voelz 548
Lipid Composition of *Mycoplasma neurolyticum*. Paul F. Smith 554
Location of Calcium Within *Bacillus* Spores by Electron Probe X-Ray Microanalysis. René Scherrer and Philipp Gerhardt 559
Specific Removal of Proteins from the Envelope of *Escherichia coli* by Protease Treatments. Masayori Inouye and Mei-Lan Yee 585
Effects of Cyclic Nucleotides and Nucleoside Triphosphates on Stalk Formation in *Caulobacter crescentus*. Jean M. Schmidt and Gay M. Samuelson 593
Development of Streptococcal L-Form Colonies. David J. Bibel and John W. Lawson 602
Reversion of Streptococcal Protoplasts. David J. Bibel and John W. Lawson 611
Cysts of *Azotobacter vinelandii* with Double Coats. Gerald D. Cagle and G. R. Vela 615
Exosporium Formation in Sporulating Cells of *Clostridium botulinum* 78A. Kenneth E. Stevenson and Reese H. Vaughn 618
Occurrence of 3-*O*-(β-D-Glucopyranosyluronic Acid)-D-Galactose in the Capsular Polysaccharide of *Klebsiella* K-Type 20. Y. M. Choy, and G. G. S. Dutton 635

Genetics and Molecular Biology

Analysis of Ribosomes from Viomycin-Sensitive and -Resistant Strains of *Mycobacterium smegmatis*. Takeshi Yamada, Kunitsugu Masuda, Ko Shoji, and Mitsuo Hori 1
Initiation of Deoxyribonucleic Acid Replication in *Escherichia coli* B/r: Chronology of Events and Transcriptional Control of Initiation. Walter Messer 7
Observations on the Post-Transcriptionally Modified Nucleotides in the 16*S* Ribosomal Ribonucleic Acid. M. L. Sogin, K. J. Pechman, L. Zablen, B. J. Lewis, and C. R. Woese 13
Deletion Mapping of the Genes Coding for HPr and Enzyme I of the Phosphoenolpyruvate:Sugar Phosphotransferase System in *Salmonella typhimurium*. J. Christopher Cordaro and Saul Roseman 17
Regulation of Macromolecular Synthesis by Putrescine in a Conditional *Escherichia coli* Putrescine Auxotroph. Delano V. Young and P. R. Srinivasan 30
Isolation of Transducing Bacteriophages for the Histidine and Isoleucine-Valine Operons in *Escherichia coli* K-12. Alessandra Avitabile, Maria S. Carlomagno-Cerillo, Renée Favre, and Francesco Blasi 40
Mapping of *rfa* Genes in *Salmonella typhimurium* by ES18 and P22 Transduction and by Conjugation. Tseng-Tong Kuo and B. A. D. Stocker 48
P22-Mediated Transduction Analysis of the Rough A (*rfa*) Region of the Chromosome of *Salmonella typhimurium*. Kenneth E. Sanderson and Yousuf A. Saeed 58
Insertion of the F Factor into the Cluster of *rfa* (Rough A) Genes of *Salmonella typhimurium*. Kenneth E. Sanderson and Hamida Saeed 64
Pleiotropic Properties and Genetic Organization of the *tolA,B* Locus of *Escherichia coli* K-12. Alan Bernstein, Barry Rolfe, and Kazukiyo Onodera 74
Multivalent Repression of Aspartic Semialdehyde Dehydrogenase in *Escherichia coli* K-12. Emmanuelle Boy and Jean-Claude Patte 84
Mutant Strains of *Escherichia coli* K-12 Exhibiting Enhanced Sensitivity to 5-Methyltryptophan. Jonathan C. Kuhn, Michael J. Pabst, and Ronald L. Somerville 93
Repression of Enzymes of Arginine Biosynthesis by L-Canavanine in Arginyl-Transfer Ribonucleic Acid Synthetase Mutants of *Escherichia coli*. Ronald Faanes and Palmer Rogers 102
Molecular Weight of Deoxyribonucleic Acid Synthesized During Initiation of Chromosome Replication in *Escherichia coli*. Peter L. Kuempel 114

Specificity of Interaction Between the First Enzyme for Histidine Biosynthesis and Aminoacylated Histidine Transfer Ribonucleic Acid. TIKVAH VOGEL, MARILYN MEYERS, JOHN S. KOVACH, AND ROBERT F. GOLDBERGER 126
Degradation of Bacteriophage Lambda Deoxyribonucleic Acid After Restriction by *Escherichia coli* K-12. VINCENT F. SIMMON AND SEYMOUR LEDERBERG 161
Selective Inhibition of Deoxyribonucleic Acid Synthesis by 2-Deoxyadenosine in the Blue-Green Bacterium *Aqmenellum quadruplicatum*. L. O. INGRAM AND W. D. FISHER 170
Factors Affecting Virulence of *Shigella flexneri*: Defective Methionine Synthesis in an *Escherichia coli-Shigella* Hybrid. SARA W. ROTHMAN AND LAURENCE M. CORWIN 176
Suppressor of Phosphofructokinase Mutations of *Escherichia coli*. A. T. E. MORRISSEY AND D. G. FRAENKEL 183
Evidence for Specific Inhibition of Translocation of Aminoacyl-Transfer Ribonucleic Acid by the Pretreatment of Ribosomes of *Bacillus subtilis* with *p*-Chloromercuribenzoate. RAJINDER SINGH RANU AND AKIRA KAJI 188
Some Unique Properties of Deoxyribonucleic Acid-Bearing Portion of the Bacterial Membrane. J. P. BALLESTA, E. CUNDLIFFE, M. J. DANIELS, JUDITH L. SILVERSTEIN, MIRIAM M. SUSSKIND, AND M. SCHAECHTER 195
Klebsiella aerogenes Strain Carrying Drug-Resistance Determinants and a *lac* Plasmid. JEAN E. BRENCHLEY AND BORIS MAGASANIK 200
Mapping of the *fabA* Locus for Unsaturated Fatty Acid Biosynthesis in *Escherichia coli*. JOHN E. CRONAN, JR., DAVID F. SILBERT, AND DANIEL L. WULFF 206
Specificity, Induction, and Absorption of Pesticin. P. C. HU, G. C. H. YANG, AND R. R. BRUBAKER 212
Activity of Deoxyribonucleic Acid Fragments of Defined Size in *Bacillus subtilis* Transformation. D. A. MORRISON AND WALTER R. GUILD 220
Effect of Deoxyribonucleic Acid Ligands on Deoxyribonucleases and Deoxyribonucleic Acid Polymerase I of *Escherichia coli* K-12. CAROLYN EBERHARD AND ROBERT L. HERRMANN 224
Isolation and Characterization of Mutants of *Escherichia coli* with Cellular Division Selectively Affected by Growth on Fatty Acids. D. SAMUEL, S. PARIS, AND G. AILHAUD 480
Competence Mutant of *Haemophilus influenzae* with Abnormal Ratios of Marker Efficiencies in Transformation. JOHN H. CASTER AND SOL H. GOODGAL 492
Genetic Characterization of a Stable F'*lac* Plasmid. FRANCIS L. MACRINA AND ELIAS BALBINDER 503
Transfer Among *Erwinia* spp. and Other Enterobacteria of Antibiotic Resistance Carried on R Factors. ARUN K. CHATTERJEE AND MORTIMER P. STARR 576
Interaction of Genes Controlling Ultraviolet Sensitivity in *Neurospora crassa*. R. W. TUVESON 632
Flagellar Cross-Repolymerization Among Different *Salmonella* Serotypes and *Escherichia coli*. NED T. BARDEN AND R. H. DEIBEL 637
Loss of Deoxyribonucleic Acid-Thymine During Thymine Starvation of *Escherichia coli*. T. R. BREITMAN, P. B. MAURY, AND J. N. TOAL 646
Toxicity of Irradiated Medium for Repair-Deficient Strains of *Escherichia coli*. ROBERT B. WEBB AND JOHN R. LORENZ 649
Toxicity of L-Tryptophan Photoproduct on Recombinationless (*rec*) Mutants of *Salmonella typhimurium*. G. YOAKUM AND A. EISENSTARK 653

Physiology and Metabolism

Isoleucine and Valine Metabolism in *Escherichia coli*. XVIII. Induction of Acetohydroxy Acid Isomeroreductase. BARRY RATZKIN, STUART ARFIN, AND H. E. UMBARGER 131
Isoleucine and Valine Metabolism in *Escherichia coli*. XIX. Inhibition of Isoleucine Biosynthesis by Glycyl-Leucine. RAYMOND A. VONDER HAAR AND H. E. UMBARGER 142
Effects of Colicins E1 and K on Permeability to Magnesium and Cobaltous Ions. JOAN E. LUSK AND DAVID L. NELSON 148

Production and Purification of a *Staphylococcus epidermidis* Bacteriocin. A. M. JETTEN, G. D. VOGELS, AND F. DE WINDT 235
Nature and Properties of a *Staphylococcus epidermidis* Bacteriocin. A. M. JETTEN AND G. D. VOGELS 243
Concerted Feedback Inhibition of the Aspartokinase of *Rhodospirillum tenue* by Threonine and Methionine: a Novel Pattern. MALKA ROBERT-GERO, LUCIEN LE BORGNE, AND GEORGES N. COHEN 251
Isoleucine Auxotrophy Due to Feedback Hypersensitivity of Biosynthetic Threonine Deaminase. W. SPRINGER, H. GRIMMINGER, AND F. LINGENS 259
Potassium Content During Growth and Sporulation in *Bacillus subtilis*. ERIC EISENSTADT 264
Site of Action of Lipid A on Mitochondria. MASAHIKO KATO 268
Interactions Between Amino Acid Transport Systems in *Neurospora crassa*. S. SANCHEZ, L. MARTINEZ, AND J. MORA 276
Comparative Electrophoretic and Amino Acid Analyses of Isolated Membranes from *Streptococcus pyogenes* and Stabilized L-Form. C. PANOS, G. FAGAN, AND C. G. ZARKADAS 285
Gluconate Regulation of Glucose Catabolism in *Pseudomonas fluorescens*. S. C. QUAY, S. B. FRIEDMAN, AND R. C. EISENBERG 291
Cystathionine Synthesis in Yeast: an Alternative Pathway for Homocysteine Biosynthesis. MICHAEL A. SAVIN AND MARTIN FLAVIN 299
Regulation of the Tryptophan Synthetic Enzymes in *Clostridium butyricum*. E. N. BASKERVILLE AND ROBERT TWAROG 304
Chemotaxis Toward Amino Acids in *Escherichia coli*. ROBERT MESIBOV AND JULIUS ADLER 315
Purification and Properties of the Adenosine Diphosphate-Glucose and Uridine Diphosphate-Glucose Pyrophosphorylases of *Mycobacterium smegmatis*: Inhibition and Activation of the Adenosine Diphosphate-Glucose Pyrophosphorylase. DAVID LAPP AND ALAN D. ELBEIN 327
Influence of Macromolecular Biosynthesis on Cellular Autolysis in *Streptococcus faecalis*. MITCHEL SAYARE, LOLITA DANEO-MOORE, AND GERALD D. SHOCKMAN 337
Differential Amino Acid Requirements for Sporulation in *Bacillus subtilis*. JEFFREY L. DOERING AND KENNETH F. BOTT 345
Inhibition of Isocitrate Lyase: the Basis for Inhibition of Growth of Two *Arthrobacter* Species by Pyruvate. PHILIP J. WOLFSON AND TERRY A. KRULWICH 356
Nonidentity of the Aspartate and the Aromatic Aminotransferase Components of Transaminase A in *Escherichia coli*. R. H. COLLIER AND G. KOHLHAW 365
Variable Ammonia Production Among Smooth and Rough Strains of *Pseudomonas pseudomallei*: Resemblance to Bacteriocin Production. MARVIN ROGUL AND SUSAN R. CARR 372
Mutant of *Escherichia coli* Deficient in the Synthesis of *cis*-Vaccenic Acid. EDWARD P. GELMANN AND JOHN E. CRONAN, JR. 381
Restoration of Reduced Nicotinamide Adenine Dinucleotide Phosphate-Nitrate Reductase Activity of a *Neurospora* Mutant by Extracts of Various Chlorate-Resistant Mutants of *Escherichia coli*. CAROLYN H. MACGREGOR AND CARL A. SCHNAITMAN 388
Oxidation of Nicotinic Acid by a *Bacillus* Species: Regulation of Nicotinic Acid and 6-Hydroxynicotinic Acid Hydroxylases. RONA HIRSCHBERG AND J. C. ENSIGN 392
Microbial Assimilation of Hydrocarbons: Cellular Distribution of Fatty Acids. R. A. MAKULA AND W. R. FINNERTY 398
Effects of Phosphonic Acid Analogues of Glycerol-3-Phosphate on the Growth of *Escherichia coli*. CHARLES S. SHOPSIS, ROBERT ENGEL, AND BURTON E. TROPP 408
Consequences of Glycerol Deprivation on the Synthesis of Membrane Components in a Glycerol Auxotroph of *Staphylococcus aureus*. PAUL H. RAY, THOMAS T. LILLICH, AND DAVID C. WHITE 413
Metabolism of Propane, *n*-Propylamine, and Propionate by Hydrocarbon-Utilizing Bacteria. W. T. BLEVINS, AND J. J. PERRY 513

Effect of *p*H on Adenine and Amino Acid Uptake During Sporulation in *Saccharomyces cerevisiae*. DALLICE MILLS 519
Isolation and Properties of a Fluorescent Compound, $Factor_{420}$, from *Methanobacterium* Strain M.o.H. P. CHEESEMAN, A. TOMS-WOOD, AND R. S. WOLFE 527
Changes in Esters of Fatty Acids of *Rhizopus arrhizus* During Germination and Growth. S. L. HESS, D. J. WEBER, AND M. GUNASEKARAN 622
Histidine Decarboxylaseless Mutants of *Lactobacillus* 30a: Isolation and Growth Properties. PAUL A. RECSEI AND ESMOND E. SNELL 624
Difference Between Manganese Ion Requirements of Pediococci and Enterococci. CONSTANTINE J. EFTHYMIOU AND SAM W. JOSEPH 627
Fatty Acid Composition of *Spirochaeta stenostrepta*. RONALD JOSEPH 629
Spore Germination of *Bacillus megaterium* QM B1551 Mutants. J. C. VARY 640
Synchronized Division in *Escherichia coli*: an Integral Portion of Culture Growth. C. PROPST RICCIUTI 643

Enzymology

Evidence Against the Presence of 3′,5′-Cyclic Adenosine Monophosphate and Relevant Enzymes in *Lactobacillus plantarum*. N. SAHYOUN AND I. F. DURR 421
CO_2-Fixing Enzymes in a Marine Psychrophile. MARIÁ C. VIDAL AND JUAN J. CAZZULO 427
Inositol Phosphate Phosphatases of Microbiological Origin: the Inositol Pentaphosphate Products of *Aspergillus ficuum* Phytases. G. C. J. Irving AND D. J. COSGROVE 434
Adenine Phosphoribosyltransferase in *Mycoplasma mycoides* and *Escherichia coli*. IRIS L. SIN AND L. R. FINCH 439
Reconstitution of *Micrococcus lysodeikticus* Reduced Nicotinamide Adenine Dinucleotide and L-Malate Dehydrogenases with Dehydrogenase-Depleted Membrane Residues: a Basis for Restoration of Oxidase Activities. ROBERT C. EISENBERG 445
Acetohydroxy Acid Synthetase with a *p*H Optimum of 7.5 from *Neurospora crassa* Mitochondria: Characterization and Partial Purification. LOUIS GLATZER, E. EAKIN, AND R. P. WAGNER 453
Phosphotransacetylase from *Clostridium acidiurici*. JAMES R. ROBINSON AND RICHARD D. SAGERS 465
Hydrolysis of $\alpha_{s,1}$-Casein B by *Streptococcus lactis* Membrane Proteinase. K. M. SORRELLS, R. A. COWMAN, AND H. E. SWAISGOOD 474
Properties of Phosphoribulokinase from *Thiobacillus neapolitanus*. ROBERT D. MACELROY, HENRY M. MACK, AND EMMETT J. JOHNSON 532
Purification and Properties of the Flavine-Stimulated Anaerobic L-α-Glycerophosphate Dehydrogenase of *Escherichia coli*. W. S. KISTLER AND E. C. C. LIN 539
Partial Purification and Characterization of *S*-Adenosylhomocysteine Hydrolase Isolated from *Saccaromyces cerevisiae*. RICHARD C. KNUDSEN AND IRVING YALL 569
A Salt-Inhibited Cytochrome *c* Reductase Obtained from the Moderately Halophilic Bacterium, *Micrococcus halodenitrificans*. JAMES E. MILLER AND LAWRENCE I. HOCHSTEIN 656

Volume 112 **Number 2**

Contents for November

Taxonomy and Ecology

Interspecies Transformation of *Acinetobacter*: Genetic Evidence for a Ubiquitous Genus. ELLIOT JUNI 917
Nutritional Requirements of *Acinetobacter* Strains Isolated from Soil, Water, and Sewage. ALICE L. WARSKOW AND ELLIOT JUNI 1014

Genetics and Molecular Biology

Temperature-Sensitive Osmotic Remedial Mutants of *Escherichia coli*. R. R. B. Russell 661
Incompatibility Groups and the Classification of *fi*⁻ Resistance Factors. Y. A. Chabbert, M. R. Scavizzi, J. L. Witchitz, G. R. Gerbaud, and D. H. Bouanchaud 666
Conditional Lethality of Deletions Which Include *uvrB* in Strains of *Escherichia coli* Lacking Deoxyribonucleic Acid Polymerase I. Hiroaki Shizuya and Daniel Dykhuizen 676
Phenotypic Suppression of Methicillin Resistance in *Staphylococcus aureus* by Mutant Noninducible Penicillinase Plasmids. Sidney Cohen, Carol J. Gibson, and H. M. Sweeney 682
Properties of RP4, an R Factor Which Originated in *Pseudomonas aeruginosa* S8. J. R. Saunders and John Grinsted 690
Polyfunctional Penicillinase Plasmid in *Staphylococcus epidermidis*: Bacteriophage Restriction and Modification Mutants. S. Schaefler 697
Self-Transfer and Genetic Recombination Mediated by P, the Sex Factor of *Vibrio cholerae*. Charlotte Parker and W. R. Romig 707
Isolation and Characterization of a Mutant Colicin E2. Christina Kennedy and Erica Sodergren 736
Homology Between the Deoxyribonucleic Acids of *Haemophilus influenzae* and *Haemophilus parainfluenzae*. M. E. Boling 745
Molecular Events Accompanying the Fixation of Genetic Information in *Haemophilus* Heterospecific Transformation. N. K. Notani and Jane K. Setlow 751
Genetic Studies on Plasmid-Linked Cadmium Resistance in *Staphylococcus aureus*. Katherine Smith and Richard P. Novick 761
Location of the Origin of Transfer of the Sex Factor F. N. S. Willetts 773
Temperature-Dependent Utilization of *meso*-Inositol: a Useful Biotyping Marker in the Genealogy of *Salmonella typhimurium*. David C. Old 779
Mapping of the Tryptophan Genes of *Acinetobacter calcoaceticus* by Transformation. R. V. Sawula and Irving P. Crawford 797
Relationship Between Sporulation-Specific 20*S* Ribonucleic Acid and Ribosomal Ribonucleic Acid Processing in *Saccharomyces cerevisiae*. Stephen J. Sogin, James E. Haber, and Harlyn O. Halvorson 806
Genetic Basis of the Biodegradation of Salicylate in *Pseudomonas*. A. M. Chakrabarty 815
Bacteriocin Production by Transformable Group H Streptococci. Richard Schlegel and Hutton D. Slade 824
Deletion and Complementation Analysis of the Biotin Gene Cluster of *Escherichia coli*. Paul P. Cleary and Allan Campbell 830
Molecular Studies on Entry Exclusion in *Escherichia coli* Minicells. Ronald J. Sheehy, Clifton Orr, and Roy Curtiss III 861
5-Bromouracil-Tolerant Mutants of *Bacillus subtilis*. Robert J. Bishop and Noboru Sueoka 870
Restoration of Phosphoribosyl Transferase Activity by Partially Deleting the *trpB* Gene in the Tryptophan Operon of *Salmonella typhimurium*. Leonard J. La Scolea, Jr. and Elias Balbinder 877
Dominant Mutations (*lex*) in *Escherichia coli* K-12 Which Affect Radiation Sensitivity and Frequency of Ultraviolet Light-Induced Mutations. David W. Mount, K. Brooks Low, and Susan J. Edmiston 886
Cell Wall Peptidoglycan Mutants of *Escherichia coli* K-12: Existence of Two Clusters of Genes, *mra* and *mrb*, for Cell Wall Peptidoglycan Biosynthesis. Tokichi Miyakawa, Hiroshi Matsuzawa, Michio Matsuhashi, and Yoshinobu Sugino 950
Spontaneous Auxotrophic and Pigmented Mutants Occurring at High Frequency in *Bacillus pumilus* NRRL B-3275. Paul S. Lovett 977

Flagellar Assembly Mutants in *Escherichia coli*. MICHAEL R. SILVERMAN AND MELVIN I. SIMON 986
Genetic Regulation of Cell Division Initiation in *Bacillus subtilis*. NEIL H. MENDELSON AND ROGER M. COLE 994
Ethambutol-Mediated Alterations in Ribonucleic Acid Components of *Mycobacterium smegmatis*. J. BACALAO AND M. RIEBER 1004
"Induction" of Colicin Factor E2-P9 by Mitomycin C. K. G. HARDY AND G. G. MEYNELL 1007
Host Cell Deoxyribonucleic Acid Polymerase I and the Support of T4 Bacteriophage Growth. DONNA GEORGE AND DAVID ROSENBERG 1017
Recombination Among Three Mitochondrial Genes in Yeast (*Saccharomyces cerevisiae*). R. A. KLEESE, R. C. GROTBECK, AND J. R. SNYDER 1023

Physiology and Metabolism

Changes in Free Amino Acid Production and Intracellular Amino Acid Pools of *Bacillus licheniformis* as a Function of Culture Age and Growth Media. V. L. CLARK, D. E. PETERSON, AND R. W. BERNLOHR 715
Isoleucine and Threonine Can Prolong Protein and Ribonucleic Acid Synthesis in Pyridoxine-Starved Mutants of *Escherichia coli* B. WALTER B. DEMPSEY AND KATHRYN R. SIMS 726
Importance of Facilitated Diffusion for Effective Utilization of Glycerol by *Escherichia coli*. D. P. RICHEY AND E. C. C. LIN 784
Physiological Studies on Ergot: Further Studies on the Induction of Alkaloid Synthesis by Tryptophan and Its Inhibition by Phosphate. J. E. ROBBERS, L. W. ROBERTSON, K. M. HORNEMANN, A. JINDRA, AND H. G. FLOSS 791
Reversal of the Mannitol-Sorbitol Diauxie in *Escherichia coli*. J. LENGELER AND E. C. C. LIN 840
Myxospore Formation in *Myxococcus xanthus*: Chemical Changes in the Cell Wall During Cellular Morphogenesis. ROOSEVELT Y. JOHNSON AND DAVID WHITE 849
Amino Sugar Assimilation by *Escherichia coli*. JAMES P. ROLLS AND C. W. SHUSTER 894
Effect of Cultural Conditions on the Fatty Acid Composition of *Thiobacillus novellus*. RICHARD A. LEVIN 903
Genetic Separation of Hypoxanthine and Guanine-Xanthine Phosphoribosyltransferase Activities by Deletion Mutations in *Salmonella typhimurium*. JOSEPH S. GOTS, CHARLES E. BENSON, AND SUSAN R. SHUMAS 910
Mutant of *Escherichia coli* with Thermosensitive Protein in the Process of Cellular Division. KAZUO NAGAI AND GAKUZO TAMURA 959
Characterization of L-Leucine-Induced Germination of *Trichophyton mentagrophytes* Microconidia. TADAYO HASHIMOTO, C. D. R. WU, AND H. J. BLUMENTHAL 967
Purine Phosphoribosyltransferases of *Salmonella typhimurium*. JANICE YANG CHOU AND ROBERT G. MARTIN 1010
Effect of Pyrrolnitrin on Electron Transport and Oxidative Phosphorylation in Mitochondria Isolated from *Neurospora crassa*. ALAN M. LAMBOWITZ AND CAROLYN W. SLAYMAN 1020
Hyperprotease-Producing Mutants of *Bacillus subtilis*. THOMAS B. HIGERD, JAMES A. HOCH, AND JOHN SPIZIZEN 1026
Protein Synthesis During Fungal Spore Germination: Differential Protein Synthesis During Germination of *Botryodiplodia theobromae* Spores. JAMES L. VAN ETTEN, HENRY R. ROKER, AND ERIC DAVIES 1029

Enzymology

High-Level Production of β-Galactosidase by *Escherichia coli* Merodiploids. AUDREE V. FOWLER 856
Properties and Purification of *N*-Acetylmuramyl-L-Alanine Amidase from *Staphylococcus aureus* H. HOWARD J. SINGER, EDMUND M. WISE, JR., AND JAMES T. PARK 932
Myxobacter AL-1 Protease II: Specific Peptide Bond Cleavage on the Amino Side of Lysine. MARILYN WINGARD, GARY MATSUEDA, AND R. S. WOLFE 940

Volume 112

Contents for December

Number 3

Taxonomy and Ecology

Purification of Mycobacterial Deoxyribonucleic Acid. ELIZABETH B. HILL, LAWRENCE G. WAYNE, AND WENDY M. GROSS 1033

Morphology and Ultrastructure

Action of Phospholipase A_2 and Phospholipase C on *Bacillus subtilis* Protoplasts. J. A. F. OP DEN KAMP, M. T. KAUERZ, AND L. L. M. VAN DEENEN 1090
Scanning Electron Microscopy of Ascospores of *Schwanniomyces*. C. P. KURTZMAN, M. J. SMILEY, AND F. L. BAKER 1380
Scanning Electron Microscopy of Spore Germination in *Dictyostelium discoideum*. R. P. GEORGE, R. M. ALBRECHT, K. B. RAPER, I. B. SACHS, AND A. P. MACKENZIE 1383
Structural Changes Associated with Extraction of Group E Spore Antigen of *Clostridium botulinum*. R. Z. HAWIRKO, K. L. CHUNG, A. J. C. MAGNUSSON, AND A. C. EMERUWA 1416

Genetics and Molecular Biology

Translation of Synthetic and Endogenous Messenger Ribonucleic Acid In Vitro by Ribosomes and Polyribosomes from *Clostridium pasteurianum*. RICHARD H. HIMES, MICHAEL R. STALLCUP, AND JESSE C. RABINOWITZ 1057
Genetic Analysis of Phenylalanine-Responding Mutants of *Pseudomonas aeruginosa*. JUDITH A. WALTHO 1070
Different Arginine Transfer Ribonucleic Acid Species Prevalent in Shaken and Unshaken Cultures of *Neurospora*. M. NAZARIO 1076
Effects of Growth Inhibitors and Ultraviolet Irradiation on F Pili. CHARLES P. NOVOTNY, PAULA F. TAYLOR, AND KAREN LAVIN 1083
Enterochelin System of Iron Transport in *Escherichia coli*: Mutations Affecting Ferric-Enterochelin Esterase. LYNDALL LANGMAN, I. G. YOUNG, G. E. FROST, H. ROSENBERG, AND F. GIBSON 1142
Temperature-Sensitive Mutation in Regulation of Ribonucleic Acid Synthesis in *Escherichia coli*. MICHIHIKO KUWANO, HIDEYA ENDO, AND MIKIO YAMAMOTO .. 1150
Transformation and Deoxyribonucleic Acid Size: Extent of Degradation on Entry Varies with Size of Donor. D. A. MORRISON AND W. R. GUILD 1157
Isolation of *rec*$^-$ Mutants in *Staphylococcus aureus*. MATSUHISA INOUE, HIROSHI OSHIMA, TOYOJI OKUBO, AND SUSUMU MITSUHASHI 1169
Effect of Elevated Temperatures on Protein Synthesis in *Escherichia coli*. DAVID PATTERSON AND DAVID GILLESPIE 1177
Polycistronic Effects of Catabolite Repression on the *lac* Operon. ALLEN E. SILVERSTONE AND BORIS MAGASANIK 1184
Inhibition of Cell-Free Protein Synthesis by Hydrostatic Pressure. J. R. SCHWARZ AND J. V. LANDAU 1222
Mercury Resistance in a Plasmid-Bearing Strain of *Escherichia coli*. ANNE O. SUMMERS AND SIMON SILVER 1228
Excision Repair Characteristics of *recB*$^-$ *res*$^-$ and *uvrC*$^-$ Strains of *Escherichia coli*. TAKESI KATO 1237
L-Arabinose Isomerase Formation in a Conditional Mutant of Gene *araA* of *Escherichia coli* B/r. JUDITH PAULEY, JOSEPH POWER, AND JOSEPH IRR 1247
Regulation of the Tyrosine Biosynthetic Enzymes in *Salmonella typhimurium*: Analysis of the Involvement of Tyrosyl-Transfer Ribonucleic Acid and Tyrosyl-Transfer Ribonucleic Acid Synthetase. J. HEINONEN, S. W. ARTZ, AND H. ZALKIN 1254
Anomalies in the Sedimentation of Deoxyribonucleic Acid from *Haemophilus influenzae* in Alkaline Sucrose Gradients. GEORGE J. KANTOR 1264
Template Specificity of Ribonucleic Acid Polymerase in Asporogenous Mutants of *Bacillus subtilis*. JEAN BREVET AND ABRAHAM L. SONENSHEIN 1270

R Factor-Controlled Restriction and Modification of Deoxyribonucleic Acid: Restriction Mutants. ROBERT YOSHIMORI, DAISY ROULLAND-DUSSOIX, AND HERBERT W. BOYER 1275
Mutant of *Escherichia coli* with Derepressed Levels of the Biotin Biosynthetic Enzymes. C. H. PAI 1280
Studies on Sex Pili: Mutants of the Sex Factor F in *Escherichia coli* Defective in Bacteriophage-Adsorbing Function of F Pili. MUNEMITSU TOMOEDA, AKEMI SHUTA, AND MANABU INUZUKA 1358
Membrane Association of the Deoxyribonucleic Acid Growing-Point Region in *Mycoplasma gallisepticum*. DENNIS C. QUINLAN AND JACK MANILOFF 1375
Pattern of Replication of a Colicin Factor During the Cell Cycle of *Escherichia coli*. J. ZEUTHEN, E. MOROZOW, AND M. L. PATO 1425
Location of the Region Controlling Host Specificity (*hs*II) with Respect to Drug Resistance Markers on the *fi*⁻ R Factor, N-3. STANLEY HATTMAN AND LAWRENCE COUSENS 1428
Deoxyribonucleic Acid Replication and Cell Division in *Escherichia coli* at 33 C. TOHRU MARUNOUCHI AND WALTER MESSER 1431
"Periplasmic" Location of a β-Lactamase Specified Either by a Plasmid or a Chromosomal Gene in *Escherichia coli*. N. A. C. CURTIS, M. H. RICHMOND, AND R. B. SYKES 1433

Physiology and Metabolism

Studies on a Thermophilic Bacillus: Its Isolation, Properties, and Temperature Coefficient of Growth. J. WARD AND A. COCKSON 1040
Isolation, Identification, and Characterization of a Lipoate-Degrading Pseudomonad and of a Lipoate Catabolite. JASON C. H. SHIH, LEMUEL D. WRIGHT, AND DONALD B. MCCORMICK 1043
Physiological Studies on *Vitreoscilla stercoraria*. D. C. MAYFIELD AND A. S. KESTER. 1052
Effect of Oxygen on Several Enzymes Involved in the Aerobic and Anaerobic Utilization of Glucose in *Escherichia coli*. ANNETTE D. THOMAS, H. W. DOELLE, A. W. WESTWOOD, AND G. L. GORDON 1099
Studies of the Acetate Kinase-Phosphotransacetylase and the Butanediol-Forming Systems in *Aerobacter aerogenes*. T. D. K. BROWN, C. R. S. PEREIRA, AND F. C. STØRMER 1106
Ubiquinone Function in *Neurospora crassa*. ALICJA K. DRABIKOWSKA AND ANNA KRUSZEWSKA 1112
Biosynthetic Pathway of Thiamine Pyrophosphate: a Special Reference to the Thiamine Monophosphate-Requiring Mutant and the Thiamine Pyrophosphate-Requiring Mutant of *Escherichia coli*. HIDEO NAKAYAMA AND RYOJI HAYASHI .. 1118
Saliva-Induced Aggregation of Oral Streptococci. S. KASHKET AND C. G. DONALDSON. 1127
Effect of the Proline Analogue Baikiain on Proline Metabolism in *Salmonella typhimurium*. SUSAN DENDINGER AND WINSTON J. BRILL 1134
Lipids of *Thermoplasma acidophilum*. THOMAS A. LANGWORTHY, PAUL F. SMITH, AND WILLIAM R. MAYBERRY 1193
Localization of Phosphoglucose Isomerase in *Escherichia coli* and Its Relation to the Induction of the Hexose Phosphate Transport System. ILAN FRIEDBERG 1201
Distribution of Neuraminidase and *N*-Acetylneuraminate Lyase Activities Among Corynebacteria, Mycobacteria, and Nocardias. SHELDON B. ARDEN, WOO-HYUN CHANG, AND LANE BARKSDALE 1206
Polyamine Metabolism in Potassium-Deficient Bacteria. KENNETH E. RUBENSTEIN, ELLEN STREIBEL, SARAH MASSEY, LILLIE LAPI, AND SEYMOUR S. COHEN 1213
Phospholipid Composition and Metabolism of *Micrococcus denitrificans*. BRIAN J. WILKINSON, MANUEL R. MORMAN, AND DAVID C. WHITE 1288
Nonfunctional Tricarboxylic Acid Cycle and the Mechanism of Glutamate Biosynthesis in *Acetobacter suboxydans*. SEYMOUR GREENFIELD AND G. W. CLAUS 1295
Isolation of Polyisoprenyl Alcohols from *Streptococcus faecalis*. JAY N. UMBREIT, K. JOHN STONE, AND JACK L. STROMINGER 1302

Isolation of the Lipid Intermediate in Peptidoglycan Biosynthesis from *Escherichia coli*. JAY N. UMBREIT AND JACK L. STROMINGER 1306
Carbon Monoxide Production from Heme Compounds by Bacteria. ROLF R. ENGEL, JOHN M. MATSEN, S. STEPHEN CHAPMAN, AND SAMUEL SCHWARTZ 1310
Metabolism of Gentiobiose in *Aerobacter aerogenes*. RICHARD E. PALMER AND RICHARD L. ANDERSON 1316
Mechanism of Inhibition of Deoxyribonucleic Acid Synthesis in *Escherichia coli* by Hydroxyurea. NAVIN K. SINHA AND D. P. SNUSTAD 1321
Heterofermentative Carbohydrate Metabolism of Lactose-Impaired Mutants of *Streptococcus lactis*. G. M. DEMKO, S. J. B. BLANTON, AND R. E. BENOIT 1335
Murein and the Outer Penetration Barrier of *Escherichia coli* K-12, *Proteus mirabilis*, and *Pseudomonas aeruginosa*. LARS G. BURMAN, KURT NORDSTRÖM, AND GUNNAR D. BLOOM 1364
Growth, Cell Division, and Fragmentation in a Species of *Flexibacter*. JOCELYN C. POOS, F. RUDOLF TURNER, DAVID WHITE, GARY D. SIMON, KAREN BACON, AND CARL T. RUSSELL 1387
Turnover of Phospholipids in an Unsaturated Fatty Acid Auxotroph of *Escherichia coli*. PETER D. CROWFOOT, TETSUO OKA, MOJTABA ESFAHANI, AND SALIH J. WAKIL 1396
Relation Between Protein Synthesis and Phospholipid Synthesis and Turnover in *Escherichia coli*. PETER D. CROWFOOT, MOJTABA ESFAHANI, AND SALIH J. WAKIL 1408
Isolation of 4′-Hydroxyechinenone from *Micrococcus roseus*. E. H. SCHWARTZEL AND J. J. COONEY 1422
Inhibition of Thiamine Transport by Chloroethylthiamine in *Escherichia coli*. AKIO IWASHIMA AND YOSHITSUGU NOSE 1438
Evidence for Vectorial Phosphorylation of D-Fructose by Intact Cells of *Aerobacter aerogenes*. NORMAN E. KELKER AND RICHARD L. ANDERSON 1441
Comparative Effect of Oxygen and Nitrate on Protoporphyrin and Heme Synthesis from Δ-Amino Levulinic Acid in Bacterial Cultures. N. J. JACOBS, J. M. JACOBS, AND H. E. MORGAN, JR. 1444

Enzymology

Location of Acid Phosphatase and β-Fructofuranosidase Within Yeast Cell Envelopes. WILFRED N. ARNOLD 1346
Phenoxazinone Synthetase from *Streptomyces antibioticus*: Multiple Activities of the Enzyme. ELLIS E. GOLUB AND JONATHAN S. NISHIMURA 1353
Formation of Polyisoprenol Phosphate Glucose in *Shigella flexneri*. W. JANKOWSKI, T. CHOJNACKI, AND EWA JANCZURA 1420
Improvement of the Specificity of an Antiserum to β-Lactamase by Absorption with a Mutant Which Does Not Produce the Enzyme. G. W. ROSS AND M. G. BOULTON 1435

International Journal of Systematic Bacteriology

Volume 21 (4) October 1971

Absolutely essential to those who must keep abreast of the ever-changing field of bacterial systematics

EDITORIAL BOARD

Erwin F. Lessel, Editor; H. P. R. Seeliger; V. B. D. Skerman, Chairman

Designation of Type Strains for *Bifidobacterium* Species. G. REUTER 273

Deoxyribonucleic Acid Homology Relationships Among Species of the Genus *Bifidobacterium*. V. SCARDOVI, L. D. TROVATELLI, G. ZANI, F. CROCIANI, and D. MATTEUZZI 276

Theoretical Deoxyribonucleic Acid Homology Between Strains in *Rhizobium japonicum*. GERALD H. ELKAN and RICHARD A. USANIS 295

Eubacterium lentum (Eggerth) Prévot 1938: Emendation of Description and Designation of the Neotype Strain. W. E. C. MOORE, ELIZABETH P. CATO, and LILLIAN V. HOLDEMAN 299

Eubacterium contortum (Prévot) comb. nov.: Emendation of Description and Designation of the Type Strain. LILLIAN V. HOLDEMAN, ELIZABETH P. CATO, and W. E. C. MOORE 304

Eubacterium aerofaciens (Eggerth) Prévot 1938: Emendation of Description and Designation of the Neotype Strain. W. E. C. MOORE, ELIZABETH P. CATO, and LILLIAN V. HOLDEMAN 307

Transfer of *Sarcina* Goodsir from the Family *Micrococcaceae* Pribram to the Family *Peptococcaceae* Rogosa. MORRISON ROGOSA 311

Relationship of *Micrococcus* sp. ATCC 407 to the Status of *Micrococcus freudenreichii* Guillebeau. I. J. McDONALD 314

Serological Investigations of *Planococcus* Strains. PER OEDING 323

Streptomyces clavuligerus sp. nov., a β-Lactam Antibiotic Producer. C. E. HIGGENS and R. E. KASTNER 326

Taxonomy of the Chlamydiae: Reasons for Classifying Organisms of the Genus *Chlamydia*, Family *Chlamydiaceae*, in a Separate Order, *Chlamydiales* ord. nov. JOHANNES STORZ and LESLIE A. PAGE 332

Published Quarterly

ASM Publications Office
1913 I St., N.W.,
Washington, D.C. 20006

Please enter my subscription to the INTERNATIONAL JOURNAL OF SYSTEMATIC BACTERIOLOGY.

Check one:

____Institution ($12)

____Personal ($8)

Name _____

Address _____

City/State/Zip _____

AUTHOR INDEX

VOLUME 112

Adler, Julius, 315
Ailhaud, G., 480
Albrecht, R. M., 1383
Anderson, Richard L., 1316, 1441
Arden, Sheldon B., 1206
Arfin, Stuart, 131
Arnold, Wilfred N., 1346
Artz, S. W., 1254
Avitabile, Alessandra, 40

Bacalao, J., 1004
Bacon, Karen, 1387
Baker, F. L., 1380
Balbinder, Elias, 503, 877
Ballesta, J. P., 195
Barden, Ned T., 637
Barker, H. A., 231
Baskerville, E. N., 304
Barksdale, Lane, 1206
Benoit, R. E., 1335
Benson, Charles E., 910
Bernlohr, R. W., 715
Bernstein, Alan, 74
Bibel, David J., 602, 611
Bishop, Robert J., 870
Blanton, S. J. B., 1335
Blasi, Francesco, 40
Blevins, W. T., 513
Bloom, Gunnar D., 1364
Blumenthal, H. J., 967
Boling, M. E., 745
Bouanchaud, D. H., 666
Boulton, M. G., 1435
Bott, Kenneth F., 345
Boy, Emmanuelle, 34
Boyer, Herbert W., 1275
Breitman, T. R., 646
Brenchley, Jean E., 200
Brevet, Jean, 1270
Brill, Winston J., 1134
Brown, T. D. K., 1106
Brubaker, R. R., 212
Burman, Lars G., 1364

Cagle, Gerald D., 615
Campbell, Allan, 830
Carlomagno-Cerillo, Maria, 50
Carr, Susan R., 372
Caster, John H., 492
Cazzulo, Juan José, 427
Chabbert, Y. A., 666
Chakrabarty, A. M., 815
Chang, Woo-Hyun, 1206
Chapman, S. Stephen, 1310
Cheeseman, P., 527
Chojnacki, T., 1420
Chou, Janice Yang, 1010
Choy, Y. M., 635
Chung, K. L., 1416
Clark, V. L., 715
Claus, G. W., 1295
Cleary, Paul P., 830
Cockson, A., 1040
Cohen, Georges N., 251
Cohen, Seymour S., 1213
Cohen, Sidney, 682
Cole, Roger M., 994
Collier, R. H., 365
Cooney, J. J., 1422
Cordaro, J. Christopher, 17
Corwin, Laurence M., 176
Cosgrove, D. J., 434
Cousens, Lawrence, 1428
Cowman, R. A., 474
Crawford, Irving P., 797
Cronan, John E., Jr., 206, 381
Crowfoot, Peter D., 1396, 1408
Cundliffe, E., 195
Curtis, N. A. C., 1433
Curtiss, Roy III, 861

Daneo-Moore, Lolita, 337
Daniels, M. J., 195
Davies, Eric, 1029
Deibel, R. H., 637
Demko, G. M., 1335
Dempsey, Walter B., 726
Dendinger, Susan, 1134
De Windt, F., 235
Doelle, H. W., 1099
Doering, Jeffrey L., 345
Donaldson, C. G., 1127
Drabikowska, Alicja K., 1112
Durr, I. F., 421
Dutton, G. G. S., 635
Dykhuizen, Daniel, 676

Eakin, E., 453
Eberhard, Carolyn, 224
Edmiston, Susan J., 886
Efthymiou, Constantine J., 627
Eisenberg, R. C., 291
Eisenberg, Robert C., 445
Eisenstadt, Eric, 264
Eisenstark, A., 653
Elbein, Alan D., 327
Emeruwa, A. C., 1416
Endo, Hideya, 1150
Engel, Robert, 408
Engel, Rolf R., 1310
Ensign, J. C., 392
Esfahani, Mojtaba, 1396, 1408

Faanes, Ronald, 102
Fagan, G., 285
Favre, Renée, 40
Finch, L. R., 439
Finnerty, W. R., 398
Fisher, W. D., 170
Flavin, Martin, 299
Floss, H. G., 791
Fowler, Audree V., 856
Fraenkel, D. G., 183
Friedberg, Ilan, 1201
Friedman, S. B., 291
Frost, G. E., 1142

Gelmann, Edward P., 381
George, Donna, 1017
George, R. P., 1383
Gerbaud, G. R., 666
Gerhardt, Philipp, 559
Gibson, Carol J., 682
Gibson, F., 1142
Gillespie, David, 1177
Glatzer, Louis, 453
Goldberger, Robert F., 126
Golub, Ellis E., 1353
Goodgal, Sol H., 492
Gordon, G. L., 1099
Gots, Joseph S., 910
Greenfield, Seymour, 1295
Grimminger, H., 259
Grinsted, John, 690
Gross, Wendy M., 1033
Grotbeck, R. C., 1023
Guild, Walter R., 220, 1157
Gunasekaran, M., 622

Haber, James E., 806
Halvorson, Harlyn O., 806
Hardy, K. G., 1007
Hashimoto, Tadayo, 967
Hattman, Stanley, 1428
Hawirko, R. Z., 1416
Hayashi, Ryoji, 1118
Heinonen, J., 1254
Herrmann, Robert L., 224
Hess, S. L., 622
Higerd, Thomas B., 1026
Hill, Elizabeth B., 1033
Himes, Richard H., 1057
Hirschberg, Rona, 392
Hoch, James A., 1026
Hochstein, Lawrence I., 656
Hong, Su-chen L., 231

Hori, Mitsuo, 1
Hornemann, K. M., 791
Hu, P. C., 212

Ingram, L. O., 170
Inoue, Matsuhisa, 1169
Inouye, Masayori, 585
Inuzuki, Manabu, 1358
Irr, Joseph, 1247
Irving, G. C. J., 434
Iwashima, Akio, 1438

Jacobs, J. M., 1444
Jacobs, N. J., 1444
Janczura, Ewa, 1420
Jankowski, W., 1420
Jetten, A. M., 235, 243
Jindra, A., 791
Johnson, Emmett J., 532
Johnson, Roosevelt Y., 849
Joseph, Ronald, 629
Joseph, Sam W., 627
Juni, Elliot, 917, 1014

Kaji, Akira, 188
Kantor, George J., 1264
Kashket, S., 1127
Kato, Masahiko, 268
Kato, Takesi, 1237
Kauerz, M. T., 1090
Kelker, Norman E., 1441
Kennedy, Christina, 736
Kester, A. S., 1052
Kistler, W. S., 539
Kleese, R. A., 1023
Knudsen, Richard C., 569
Kohlhaw, G., 365
Kovach, John S., 126
Krulwich, Terry A., 356
Kruszewska, Anna, 1112
Kuempel, Peter L., 114
Kuhn, Jonathan C., 93
Kuo, Tseng-Tong, 48
Kurtzman, C. P., 1380
Kuwano, Michihiko, 1150

Lambowitz, Alan M., 1020
Landau, J. V., 1222
Langman, Lyndall, 1142
Langworthy, Thomas A., 1193
Lapi, Lillie, 1213
Lapp, David, 327
La Scolea, Leonard J., Jr., 877
Lavin, Karen, 1083
Lawson, John W., 602, 611
Le Borgne, Lucien, 51
Lederberg, Seymour, 161
Lengeler, J., 840
Levin, Richard A., 903
Lewis, B. J., 13
Lillich, Thomas T., 413
Lin, E. C. C., 539, 784, 840
Lingens, F., 259
Lorenz, John R., 649
Lovett, Paul S., 977
Low, K. Brooks, 886
Lusk, Joan E., 148

McCormick, Donald B., 1043
MacElroy, Robert D., 532
MacGregor, Carolyn H., 388
MacKenzie, A. P., 1383
Mack, Henry M., 532
Macrina, Francis L., 503
Magasanik, Boris, 200, 1184
Magnusson, A. J. C., 1416
Makula, R. A., 398
Maniloff, Jack, 1375
Martin, Robert G., 1010
Martinez, L., 276
Marunouchi, Tohru, 1431
Massey, Sarah, 1213
Masuda, Kunitsugu, 1
Matsen, John M., 1310
Matsueda, Gary, 940
Matsuhashi, Michio, 950
Matsuzawa, Hiroshi, 950
Maury, P. B., 646
Mayberry, William R., 1193
Mayfield, D. C., 1052
Mendelson, Neil H., 994
Mesibov, Robert, 315
Messer, Walter, 7, 1431
Meyers, Marily, 126
Meynell, G. G., 1007
Miller, James E., 656
Mills, Dallice, 519
Mitsuhashi, Susumu, 1169
Miyakawa, Tokichi, 950
Mora, J., 276
Morgan, H. E., Jr., 1444
Morman, Manuel R., 1288
Morozow, E., 1425
Morrison, D. A., 220, 1157
Morrissey, A. T. E., 183
Mount, David W., 886

Nagai, Kazuo, 959
Nakayama, Hideo, 1118
Nazario, M., 1076
Nelson, David L., 148
Nishimura, Jonathan S., 1353
Nordström, Kurt, 1364
Nose, Yoshitsugu, 1438
Notani, N. K., 751
Novick, Richard P., 761
Novotny, Charles P., 1083

Oka, Tetsuo, 1396
Okubo, Toyoji, 1169
Old, David C., 779
Onodera, Kazukiyo, 74
Op den Kamp, J. A. F., 1090
Orr, Clifton, 861
Oshima, Hiroshi, 1169

Pabst, Michael J., 93
Pai, C. H., 1280
Palmer, Richard E., 1316
Panos, C., 285
Park, James T., 932
Parker, Charlotte, 707
Paris, S., 480
Pato, M. L., 1425
Patte, Jean-Claude, 84
Patterson, David, 1177
Pauley, Judith, 1247
Pechman, K. J., 13
Pereira, C. R. S., 1106
Perry, J. J., 513
Peterson, D. E., 715
Poos, Jocelyn C., 1387
Power, Joseph, 1247

Quay, S. C., 291
Quinlan, Dennis C., 1375

Ranu, Rajinder Singh, 188
Rabinowitz, Jesse C., 1057
Raper, K. B., 1383
Ratzkin, Barry, 131
Ray, Paul H., 413
Recsei, Paul A., 624
Ricciuti, C. Propst, 643
Richey, D. P., 784
Richmond, M. H., 1433
Rieber, M., 1004
Robbers, J. E., 791
Robert-Gero, Malka, 251
Robertson, L. W., 791
Robinson, James R., 465
Rogers, Palmer, 102
Rogul, Marvin, 372
Roker, Henry R., 1029
Rolfe, Barry, 74
Rolls, James P., 894
Romig, W. R., 707
Roseman, Saul, 17
Rosenberg, David, 1017
Rosenberg, H., 1142
Ross, G. W., 1435
Rothman, Sara W., 176
Roulland-Dussoix, Daisy, 1275
Rubenstein, Kenneth E., 1213
Russell, Carl T., 1387
Russell, R. R. B., 661

Sachs, I. B., 1383
Saeed, Hamida, 64
Saeed, Yousuf A., 58
Sagers, Richard D., 465
Sahyoun, N., 421
Samuel, D., 480
Samuelson, Gay M., 593
Sanchez, S., 276
Sanderson, Kenneth E., 58, 64
Saunders, J. R., 690
Savin, Michael A., 299
Sawula, R. V., 797
Sayare, Mitchel, 337
Scavizzi, M. R., 666
Schaechter, M., 195

Schaefler, S., 697
Scherrer, René, 559
Schlegel, Richard, 824
Schmidt, Jean M., 593
Schnaitman, Carl A., 388
Schwartz, Samuel, 1310
Schwartzel, E. H., 1422
Schwarz, J. R., 1222
Setlow, Jane K., 751
Sheehy, Ronald J., 861
Shih, Jason C. H., 1043
Shizuya, Hiroaki, 676
Shockman, Gerald D., 337
Shoji, Ko, 1
Shopsis, Charles S., 408
Shumas, Susan R., 910
Shuster, C. W., 894
Shuta, Akemi, 1358
Silbert, David F., 206
Silver, Simon, 1228
Silverman, David J., 548
Silverman, Michael R., 986
Silverstein, Judith L., 195
Silverstone, Allen E., 1184
Simmon, Vincent F., 161
Simon, Gary D., 1387
Simon, Melvin I., 986
Sims, Kathryn R., 726
Sin, Iris L., 439
Singer, Howard J., 932
Sinha, Navin K., 1321
Slade, Hutton D., 824
Slayman, Carolyn W., 1020
Smiley, M. J., 1380
Smith, Katherine, 761
Smith, Paul F., 554, 1193
Snell, Esmond E., 624
Snustad, D. Peter, 1321
Snyder, J. R., 1023
Sodergren, Erica, 736
Sogin, M. L., 13
Sogin, Stephen J., 806
Somerville, Ronald L., 93
Sonenshein, Abraham L., 1270
Sorrells, K. M., 474
Spizizen, John, 1026
Springer, W., 259
Srinivasan, P. R., 30
Stallcup, Michael R., 1057
Starr, Mortimer P., 576
Stevenson, Kenneth E., 618
Stocker, B. A. D., 48
Stone, K. John, 1302
Størmer, F. C., 1106
Streibel, Ellen, 1213
Strominger, Jack L., 1302, 1306
Sueoka, Noboru, 870
Sugino, Yoshinobu, 950
Summers, Anne O., 1228
Susskind, Miriam M., 195
Swaisgood, H. E., 474
Sweeney, H. M., 682
Sykes, R. B., 1433

Tamura, Gakuzo, 959
Taylor, Paula F., 1083
Thomas, Annette D., 1099
Toal, J. N., 646
Tomoeda, Munemitsu, 1358
Toms-Wood, A., 527
Tropp, Burton E., 408
Turner, F. Rudolf, 1387
Tuveson, R. W., 632
Twarog, Robert, 304

Umbarger, H. E., 131, 142
Umbreit, Jay N., 1302, 1306

van Deenen, L. L., 1090
Van Etten, James L., 1029
Vary, J. C., 640
Vaughn, Reese H., 618
Vela, G. R., 615
Vidal, María Cristina, 427
Voelz, Herbert, 548
Vogel, Tikvah, 126
Vogels, G. D., 235, 243
Vonder Haar, Raymond A., 142

Wagner, R. P., 453
Wakil, Salih J., 1396, 1408
Waltho, Judith A., 1070
Ward, J., 1040
Warskow, Alice L., 1014
Wayne, Lawrence G., 1033
Webb, Robert B., 649
Weber, D. J., 622
Westwood, A. W., 1099
White, David, 849
White, David C., 413
Wilkinson, Brian J., 1288
Willetts, N. S., 773
Wingard, Marilyn, 940
Wise, Edmund M., Jr., 932
Witchitz, J. L., 666
Woese, C. R., 13
Wolfe, R. S., 527, 940
Wolfson, Philip J., 356
Wright, Lemuel D., 1043
Wu, C. D. R., 967
Wulff, Daniel L., 206

Yall, Irving, 569
Yamada, Takeshi, 1
Yamamoto, Mikio, 1150
Yang, G. C. H., 212
Yee, Mei-Lan, 585
Yoakum, G., 653
Yoshimori, Robert, 1275
Young, Delano V., 30
Young, I. G., 1142

Zablen, L., 13
Zalkin, H., 1254
Zarkadas, C. G., 285
Zeuthen, J., 1425

SUBJECT INDEX

VOLUME 112

Acetate kinase
A. aerogenes, 1106
Acetobacter suboxydans
glutamate synthesis, 1295
tricarboxylic acid cycle, 1295
Acetohydroxy acid synthetase
N. crassa, 453
N-Acetylmuramyl-L-alanine amidase
S. aureus H, 932
N-Acetyneuraminate lyase
corynebacteria, mycobacteria, nocardias, 1206
Acid phosphatase
yeast cell wall, 1346
Acinetobacter
interspecies transformation, 917
nutritional requirements, 1014
Acinetobacter calcoaceticus
tryptophan genes, 797
Acridines
effects on DNA-dependent enzymes, 224
Adenine
uptake during yeast sporulation, 519
Adenine phosphoribosyltransferase
E. coli, 439
M. mycoides, 439
Adenosine diphosphate-glucose pyrophosphorylase
M. smegmatis, 327
Adenosine monophosphate
cyclic, 421
Adenosine triphosphate
effect on *C. crescentus* stalk formation, 593
S-Adenosylhomocysteine hydrolase
S. cerevisiae, 569
S-Adenosylmethionine
synthesis, 1213
Aerobacter aerogenes
acetate excretion, 1106
butanediol formation, 1106
fructose phosphorylation, 1441
gentiobiose metabolism, 1316
Aerobiosis
transition to anaerobiosis, 1099
Agmenellum quadruplicatum
DNA synthesis inhibition, 170
Alcohols
polyisoprenyl, 1302, 1306
Alkaloid
synthesis induction by tryptophan, 791
Amino acids
chemotaxis toward, 315
pools in *B. licheniformis*, 714
requirements for sporulation, 345
synthesis in *P. aeruginosa*, 1070
transport in *N. crassa*, 276
uptake during yeast sporulation, 519
Amino sugars
assimilation in *E. coli*, 894
Ammonia
production by *P. pseudomallei*, 372
L-Arabinose isomerase
thermosensitive, 1247
Arginine
synthesis repression, 102
Arginyl-transfer ribonucleic acid
two-species, 1076
Aromatic amino acids
synthesis in *P. aeruginosa*, 1070
Aromatic aminotransferase
separation from aspartate aminotransferase, 365
Arrhenius equation, 1040
Arthrobacter spp.
growth inhibition by pyruvate, 356
Ascospores
Schwanniomyces, 1380
Aspartate aminotransferase
separation from aromatic aminotransferase, 365
Aspartate chemoreceptor, 315
Aspartic semialdehyde dehydrogenase
multivalent repression, 84
Aspartokinase
feedback inhibition in *R. tenue*, 251
Aspergillus ficuum
phytase products, 434
Autolysis
S. aureus enzyme, 932
S. faecalis, 337
Azotobacter vinelandii
cysts with double coats, 615

Bacillus
nicotinic acid regulation, 392
Bacillus cereus
spores, 559
Bacillus licheniformis
amino acid pools, 714
Bacillus megaterium
spore germination, 640
spores, 559
Bacillus pumilus
high rate of mutation, 977
Bacillus subtilis
amino acid requirements, 345
asporogenous mutants, 1270
5-bromouracil tolerance, 870
cell division initiation, 994
DNA size in transformation, 220
membrane phospholipid degradation, 1090
potassium content, 264
protease producers, 1026
ribosomes, 188
RNA polymerase, 1270

sporulation, 264, 345
Bacteriocin
group H streptococci, 824
properties of, 243
purification, 235
S. epidermidis, 235, 243
Bacteriophage ES18
rfa gene mapping, 48
Bacteriophage lambda
restriction by *E. coli*, 161
Bacteriophage P22
rfa gene mapping, 48, 58
Bacteriophages
his and *ilv* transducing, 40
Bacteriophage T4
in *polA1* mutants, 1017
Baikiain
effect on proline metabolism, 1134
Beta-oxidation
lipoic acid, 1043
Biotin
derepressed synthesis, 1280
gene cluster in *E. coli*, 830
Botryodiplodia theobromae
spore germination, 1029
Brevibacterium
3,5-diaminohexanoate degradation, 231
5-Bromouracil
tolerant mutants, 780
Butanediol
synthesis by *A. aerogenes*, 1106

Cadmium
plasmid-linked resistance, 761
Calcium
location within spores, 559
L-Canavanine
repression of arginine synthesis, 102
resistance to in *N. crassa*, 276
Capsular polysaccharide
Klebsiella K-type 20, 635
Carbon dioxide-fixing enzymes
marine psychrophile, 427
Carbon monoxide
production from heme compounds, 1310
Carotenoids
hydroxyechinenone from *M. roseus*, 1422
Catabolite repression
lac operon, 1184
Caulobacter crescentus
stalk formation, 593
Cell division
at 33 C, 1431
B. subtilis, 994
E. coli, 480, 643, 959, 1431
Flexibacter, 1387
initiation regulation, 994
mutants grown on fatty acids, 480
synchronized, 643
temperature-sensitive mutant, 959
Cell envelope
E. coli osmotic remedial mutants, 661
Cell membrane
B. subtilis protoplasts, 1090
E. coli, 1364
P. aeruginosa, 1364
penetration barrier, 1364
permeability barrier damage by colicins, 148
phospholipid degradation, 1090
phospholipid turnover, 1396, 1408
P. mirabilis, 1396
Cell wall
E. coli, 950, 1306
enzymes in yeast, 1346
M. xanthus myxospores, 849
peptidoglycan, 950
peptidoglycan intermediate, 1306
Chemotaxis
toward amino acids, 315
Chlorethylthiamine
thiamine transport inhibition, 1438
p-Chloromercuribenzoate
inhibition of ribosome activity, 188
Chromosome replication
DNA molecular weight, 114
Clostridium acidiurici
phosphotransacetylase, 465
Clostridium botulinum
exosporium formation, 618
spore coat antigen, 1416
Clostridium butyricum
tryptophan synthesis regulation, 304
Clostridium pasteurianum
protein synthesis, 1057
Colicin E1
inhibition of Mg^{2+}, Co^{2+} transport, 148
Colicin E2
temperature-sensitive, 736
Colicin E2-P9
"induction" by mitomycin C, 1007
Colicin factor
replication, 1425
Colicin K
inhibition of Mg^{2+}, Co^{2+} transport, 148
Colicin tolerance
pleiotropic properties of mutants, 74
Competence
group H streptococci, 824
Complementation analysis
bio gene cluster, 830
Conjugation
rfa gene mapping, 48
Corynebacteria
neuramidase and *N*-acetylneuraminate lyase, 1206
3′,5′-Cyclic adenosine monophosphate
absence in *L. plantarum*, 421
Cystathionine
synthesis in yeast, 299
Cysts
A. vinelandii, 615
Cytochrome *c* reductase
salt-inhibited, 656

2-Deoxyadenosine
inhibition of DNA synthesis, 170
Deoxyribonucleic acid
Acinetobacter spp., 917

acridine effect on DNA-dependent enzymes, 224
A. quadruplicatum, 170
B. megaterium, 195
B. subtilis, 220
chromosome replication initiation, 114
Col E2-P9, 1007
colicin action on, 736
degradation after restriction, 161
D. pneumoniae, 1157
donor degradation and size, 1157
E. coli 7, 114, 195, 646, 1321, 1431
entry exclusion, 861
excision repair, 1237
growing point, 1375
heterospecific transformation, 751
H. influenzae, 745, 751, 1264
H. parainfluenzae, 745, 751
loss of DNA-thymine, 646
membrane-associated, 1375
-membrane complex, 195
M. gallisepticum, 1375
mitochondrial, 1023
mycobacterial, 1033
-polysaccharide complex, 1033
phage λ, 161
purification, 1033
replication at 33 C, 1431
replication initiation, 7, 114
restriction and modification, 161, 1275
sedimentation procedure, 1264
synthesis inhibition, 170
synthesis inhibition by hydroxyurea, 1321
transformation, 220, 492, 751, 1157
Deoxyribonucleic acid homology
H. influenzae and *H. parainfluenzae*, 745
Deoxyribonucleic acid polymerase I
mutant lacking, 676
support of T4 growth, 1017
3,5-Diaminohexanoate
degradation by *Brevibacterium*, 231
Dictostelium discoideum
spore germination, 1383
3,4-Dihydroxybutyl-1-phosphate
inhibition of *E. coli*, 408
Diplococcus pneumoniae
DNA size and transformation, 1157

Electron transport
pyrrolnitrin effects on, 1020
ubiquinone functions, 1112
Embden-Meyerhof pathway
S. lactis mutants, 1335
Enterobacter cloacae
β-lactamase-less mutant, 1435
Enterobacteriaceae
R factor transfer among, 576
Enterochelin
E. coli mutants, 1142
Enterococci
Mn^{2+} supplementation, 627
Entner-Doudoroff pathway
induced by gluconate, 291
Entry exclusion
E. coli minicells, 861
Envelope proteins
proteolytic digestion, 585
Ergot
alkaloid synthesis induction, 791
Erwinia spp.
R factor transfer to, 576
Escherichia coli
adenine phosphoribosyltransferase, 439
aerobiosis-anaerobiosis change, 1099
L-arabinose isomerase mutant, 1247
arginine synthesis, 102
aspartic semialdehyde dehydrogenase, 84
biotin gene cluster, 830
biotin regulation, 1280
cell division, 643, 959, 1431
chemotaxis toward amino acids, 315
chl mutants, 388
chromosome replication, 114
colicin factor replication, 1425
colicin tolerance, 74
DNA-dependent enzymes, 224
DNA inhibition by hydroxyurea, 1321
DNA replication, 7, 1431
envelope proteins, 585
entry exclusion, 861
excision repair, 1237
fabA locus, 206
fatty acid growth mutants, 480
ferric-enterochelin esterase, 1142
F*lac* plasmid, 503
flagellar assembly mutants, 986
flagellar cross-repolymerization, 637
fluorescent light toxicity, 649
F pili mutants, 1358
β-galactosidase producers, 856
glucosamine assimilation, 894
glucose regulation, 1099
glycerol utilization, 784
L-α-glycerophosphate dehydrogenase, 539
growth inhibition, 408
hexose phosphate uptake, 1201
his and *ilv* transducing phages, 40
isoleucine-valine synthesis, 131, 142
lac operon, 1184
β-lactamase location, 1433
lex mutants, 886
mannitol-sorbitol diauxie, 840
membrane penetration barrier, 1364
mercury resistance, 1228
methyltryptophan sensitivity, 93
minicells, 861
nitrate reductase, 388
osmotic remedial mutants, 661
peptidoglycan intermediate, 1306
peptidoglycan synthesis genes, 950
pfkA, *B*, 183
phospholipid turnover, 1396, 1408
pili production, 1083
polA1 mutants, 676, 1017
polyamine metabolism, 1213
protein synthesis inactivation, 1177
putrescine auxotroph, 30

pyridoxine-starved mutants, 726
recB⁻ mutants, 1237
rel influence on lipid synthesis, 1408
repair-deficient strains, 649
res⁻ mutants, 1237
restriction mutants, 1275
restriction of λ DNA, 161
R factor transfer, 576
ribosomal helices, 548
RNA synthesis mutants, 1150
synchronized cell division, 643
thiamine-requiring mutants, 1118
thiamine transport, 1438
thymine starvation, 646
tolA, *B* locus, 74
transaminase A, 365
trp mutations, 93
uvrB deletions, 676
uvrC⁻ mutants, 1237
UV sensitivity, 886
cis-vaccenic acid mutant, 381
Escherichia coli-Shigella hybrid
methionine synthesis defect, 176
Ethambutol
RNA alteration by, 1004
Excision repair
recB⁻, *res*⁻, and *uvrC*⁻ mutants, 1237
Exonuclease
DNA degradation after restriction, 161

Facilitated diffusion
of glycerol in *E. coli*, 784
Fatty acid esters
R. arrhizus, 622
Fatty acids
cultural condition effects, 903
fabA locus of *E. coli*, 206
M. cerificans, 398
M. neurolyticum, 554
slow growth on, 480
Spirochaeta stenostrepta, 629
synthesis in glycerol auxotroph, 413
T. novellus, 903
cis-vaccenic acid synthesis mutant, 381
Ferredoxin
synthesis by *C. pasteurianum*, 1057
Ferric-enterochelin esterase, 1142
F factor
defective pili, 1358
entry exclusion, 861
origin of transfer, 773
pili production, 1083
S. typhimurium rfa cluster, 64
F*lac*
characterization of mutant, 503
Flagella
assembly mutants, 986
cross-repolymerization, 637
Flavine
stimulation of L-α-glycerophosphate dehydrogenase, 539
Flexibacter
growth, cell division, fragmentation, 1387
Fluorescent compound
from *Methanobacterium*, 527
Fluorescent light
toxicity to repair-deficient *E. coli*, 649
β-Fructofuranosidase
yeast cell wall, 1346
Fructose
vectorial phosphorylation, 1441
Fructose-6-phosphate
induction of hexose phosphate uptake, 1201

Galactose
metabolism by *S. lactis* mutants, 1335
β-Galactosidase
catabolite repression, 1184
production in large amounts, 856
Gentiobiose
metabolism in *A. aerogenes*, 1316
Gluconate
regulation of glucose catabolism, 291
Glucosamine
assimilation in *E. coli*, 894
Glucose
catabolism regulation, 291
regulation by *E. coli*, 1099
Glutamate
synthesis in *A. suboxydans*, 1295
Glycerol
deprivation effects, 413
facilitated diffusion of, 784
Glycerol-3-phosphate
analogues, 408
L-α-Glycerophosphate dehydrogenase
E. coli, 539
Glycine
transport system, 413
Glycolipids
Thermoplasma acidophilum, 1193
Growth temperature
relation to temperature coefficient of growth, 1040
Guanine
phosphoribosyltransferase, 910, 1010
Guanine plus cytosine content
mycobacterial DNA, 1033
Guanosine triphosphate
effect on *C. crescentus* stalk formation, 593

Haemophilus influenzae
competence mutant, 492
DNA homology with *H. parainfluenzae*, 745
DNA sedimentation method, 1264
heterospecific transformation, 751
Haemophilus parainfluenzae
DNA homology with *H. influenzae*, 745
heterospecific transformation, 751
Heme
synthesis conditions, 1444
Heme compounds
CO production from, 1310
Hemolysis
CO production, 1310
Hexose phosphate transport
induction of, 1201
his operon

transducing phage for, 40
Histidine
synthesis regulation, 126
Histidine decarboxylase
Lactobacillus mutants lacking, 624
Homocysteine
synthesis pathways in yeast, 299
Hydrocarbons
M. cerificans grown on, 398
metabolism of, 513
Hydrostatic pressure
protein synthesis inhibition, 1222
Hydroxyechineone
M. roseus, 1422
Hydroxyurea
DNA synthesis inhibition, 1321

ilv operon
transducing phage for, 40
Incompatibility
fi$^-$ R factors, 666
meso-Inositol
fermentation by *S. typhimurium*, 779
Inositol phosphate phosphatase
Aspergillus ficuum, 434
Iron transport
ferric-enterochelin esterase, 1142
Isocitrate lyase
inhibition in *Arthrobacter*, 356
Isoleucine
synthesis inhibition, 142
threonine deaminase inhibition by, 259
Isoleucine-valine synthesis
induction of acetohydroxy acid isomeroreductase, 131

Klebsiella
capsular polysaccharide, 635
Klebsiella aerogenes
drug resistance and *lac* plasmid, 200

lac operon
catabolite repression target site, 1184
lac plasmid
K. aerogenes, 200
β-Lactamase
antiserum production, 1435
location of, 1433
Lactobacillus 30a
histidine decarboxylaseless mutants, 624
Lactobacillus plantarum
absence of cAMP, 421
Lactose
metabolism by *S. lactis* mutants, 1335
Leucine
germination inducer, 967
lex mutations, 886
L-forms
development of colonies, 602
S. pyogenes, 285
Lipid A
effect on mitochondria, 268
Lipids
fatty acids, 206, 381, 398, 413, 480, 622, 629, 903
of *M. neurolyticum*, 554
of *Thermoplasma acidophilum*, 1193
phospholipids, 413, 1288, 1396, 1408
Lipoic acid
metabolic pathway, 1043
Lipopolysaccharide
lipid A effect on mitochondria, 268
S. typhimurium rfa genes, 48, 58, 64

Manganese
requirement in pediococci and enterococci, 627
Mannitol
diauxie with sorbitol, 840
Marine psychrophile
CO_2-fixing enzymes, 427
M-band technique, 195
Membranes
B. megaterium, 195
DNA-bearing, 195
E. coli, 195
enzyme activity restoration, 445
M. lysodeikticus, 445
S. pyogenes and L-form, 285
Mercury
resistance to in *E. coli*, 1228
Messenger ribonucleic acid
C. pasteurianum, 1057
E. coli, 1150
stimulation by putrescine, 30
synthesis mutants, 1150
Methanobacterium M.o.H.
fluorescent compound from, 527
Methicillin
resistance gene in *S. aureus*, 682
Methionine
aspartokinase inhibition by, 251
defective synthesis in *E. coli-Shigella* hybrid, 176
5-Methyltryptophan
sensitivity to, 93
Micrococcus cerificans
fatty acid distribution, 398
Micrococcus denitrificans
phospholipid composition, 1288
Micrococcus halodenitrificans
salt-inhibited cytochrome *c* reductase, 656
Micrococcus lysodeikticus
reconstitution of dehydrogenases, 445
Micrococcus roseus
hydroxyechinenone from, 1422
Microconidia
T. mentagrophytes, germination, 967
Minicells
entry exclusion, 861
Mitochondria
genes, *S. cerevisiae*, 1023
lipid A effect on, 268
N. crassa, 1020
N. crassa acetohydroxy acid synthetase, 453
pyrrolnitrin effects on, 1020
Mitomycin C
"induction" of ColE2-P9, 1007

Murein
penetration barrier role, 1364
Mutation
high rate of, *B. pumilus*, 977
Mycobacteria
DNA purification, 1033
neuraminidase and *N*-acetyneuraminate lyase, 1206
Mycobacterium smegmatis
ADP-Glc pyrophosphorylase, 327
ethambutol effect on RNA, 1004
UDP-Glc pyrophosphorylase, 327
viomycin resistance, 1
Mycoplasma gallisepticum
DNA growing point, 1375
Mycoplasma mycoides
adenine phosphoribosyltransferase, 439
Mycoplasma neurolyticum
lipid composition, 554
Myxamoebae
D. discoideum, 1383
Myxobacter AL-1
protease II, 940
Myxococcus xanthus
cell wall during myxospore formation, 849
Myxospores
M. xanthus, 849

Neuraminidase
corynebacteria, mycobacteria, nocardias, 1206
Neurospora
arginyl-tRNA species, 1076
nitrate reductase restored to mutants, 388
Neurospora crassa
acetohydroxy acid synthetase, 453
amino acid transport, 276
electron transport, 1020
oxidative phosphorylation, 1020
ubiquinone function, 1112
UV sensitivity genes, 632
Neutral lipids
Thermoplasma acidophilum, 1193
Nicotinic acid
regulation of, 392
Nitrate reductase
Neurospora mutants, 388
Nocardias
neuraminidase and *N*-acetyneuraminate lyase, 1206

Osmotic pressure
effect on osmotic remedial mutants, 661
Oxidase
restoration of activity, 445
Oxidative phosphorylation
pyrrolnitrin effects on, 1020
Oxygen
effect on glucose utilization, 1099

Pediococcus cerevisiae
Mn^{2+} requirement, 627
Penicillinase plasmids
cadmium resistance loci, 761
deletion map, 697
methicillin resistance suppression by, 682
restriction and modification mutants, 697
Peptidoglycan
changes during myxospore formation, 849
E. coli, 1306
identification of an intermediate, 1306
synthesis genes, 950
Pesticin
specificity, induction, absorbtion, 212
Phenoxazinone synthetase
S. antibioticus, 1353
Phenylalanine
P. aeruginosa auxotrophs, 1070
Phosphoenolpyruvate carboxylase
marine psychrophile, 427
Phosphoenolpyruvate:sugar phosphotransferase
genes for HPr and enzyme I, 17
Phosphofructokinase
genes in *E. coli*, 183
Phosphoglucose isomerase
localization of, 1201
Phospholipase
degradation of protoplast phospholipids, 1090
Phospholipids
M. denitrificans, 1288
M. neurolyticum, 554
rel effect on synthesis, 1408
synthesis in glycerol auxotroph, 413
Thermoplasma acidophilum, 1193
turnover in a fatty acid auxotroph, 1396, 1408
Phosphoribosyltransferases
adenine, 439
guanine, 1010
guanine-xanthine, 910
in histidine synthesis, 126
mutant in *S. typhimurium*, 877
Phosphoribulokinase
T. neapolitanus, 532
Phosphorylation
lipid A effect on, 268
of fructose, 1441
Phosphotransacetylase
A. aerogenes, 1106
C. acidiurici, 465
Photoreactivation
N. crassa, 632
Phytase
Aspergillus ficuum, 434
Pili
defective, 1358
requirements for elongation and retention, 1083
Polyamine
cation effects on metabolism, 1213
Polyisoprenol phosphate glucose
formation by *S. flexneri*, 1420
Polyisoprenyl alcohols
E. coli peptidoglycan, 1306
S. faecalis, 1302
Polyribosomes
C. pasteurianum, 1057
Polysaccharide
contamination of DNA preparations, 1033
Potassium
effect on polyamine metabolism, 1213

vegetative and sporulating *B. subtilis*, 264
Proline
baikiain effects on metabolism, 1134
Propane
metabolism of, 513
Propionate
metabolism of, 513
n-Propylamine
metabolism of, 513
Protease
hyperproduction by *B. subtilis*, 1026
myxobacter strain AL-1, 940
Proteinase
S. lactis, 474
Protein synthesis
B. theombromae spore germination, 1029
cell-free, 1222
C. pasteurianum, 1057
E. coli, 1177
hydrostatic pressure effects on, 1222
pyridoxine-starved mutants, 726
stimulation by putrescine, 30
temperature inactivation, 1177
Proteolytic enzymes
B. subtilis protease, 1026
myxobacter protease, 940
S. lactis proteinase, 474
specific removal of envelope proteins, 585
Proteus mirabilis
membrane penetration barrier, 1314
Protoplasts
S. faecium, 611
Protoporphyrin
conditions for accumulation, 1444
Pseudomonad
lipoate-degrading, 1043
Pseudomonas
CO_2-fixing enzymes, 427
marine psychrophile, 427
Pseudomonas aeruginosa
membrane penetration barrier, 1364
phenylalanine auxotrophs, 1070
protoporphyrin synthesis, 1444
R factor from, 690
Pseudomonas denitrificans
protoporphyrin synthesis, 1444
Pseudomonas fluorescens
glucose catabolism, 291
Pseudomonas pseudomallei
ammonia production, 372
Pseudomonas putida
salicylate degradation, 815
Putrescine
stimulation of protein synthesis, 30
synthesis of, 1213
Pyridoxine
starvation for and macromolecular synthesis, 726
Pyrrolnitrin
effect on electron transport and oxidative phosphorylation, 1020
Pyruvate
inhibition of *Arthrobacter* growth, 356

rec mutants
isolation from *S. aureus*, 1169
Recombination
V. cholerae, 707
Respiration
aerobic-anaerobic transition, 1099
E. coli, 1099
Restriction
degradation of λ DNA, 161
R factor-controlled, 1275
R factors
entry exclusion, 861
host specificity of N-3, 1428
incompatibility groups, 666
restriction and modification controlled by, 1275
RP4, properties of, 690
transfer among enterobacteria, 576
Rhizopus arrhizus
esters of fatty acids, 622
Rhodospirillum tenue
aspartokinase inhibition, 251
Ribonucleic acid
C. pasteurianum, 1057
E. coli, 1150
ethambutol effects on, 1004
messenger, 30, 1057, 1150, 1222
M. smegmatis, 1004
ribosomal, 13, 806, 1150
sporulation-specific, 806
synthesis in pyridoxine-starved mutants, 726
synthesis mutants, 1150
transfer, 102, 126, 188, 1076, 1150, 1222, 1254
Ribonucleic acid polymerase
B. subtilis asporogenous mutants, 1270
Ribonucleoside diphosphate reductase
inhibition by hydroxyurea, 1321
Ribosomal ribonucleic acid
E. coli, 1150
post-transcriptionally modified nucleotides, 13
S. cerevisiae, 806
synthesis mutants, 1150
Ribosomes
p-chloromercuribenzoate effects on, 188
C. pasteurianum, 1057
E. coli, 548
helix disappearance, 548
M. smegmatis, 1
viomycin resistance, 1

Saccharomyces cerevisiae
acid phosphatase, 1346
S-adenosylhomocysteine hydrolase, 569
cystathionine synthesis, 299
β-fructofuranoside, 1346
homocysteine synthesis, 299
mitochondrial genes, 1023
*p*H effect on sporulation, 519
sporulation-specific RNA, 806
Salicylate
biodegradation in *P. putida*, 815
Saliva
aggregation of oral streptococci, 1127
Salmonella

flagellar cross-repolymerization, 637
Salmonella typhimurium
biotyping, 779
F insertion in *rfa* cluster, 64
F*lac* plasmid, 503
guanine phosphoribosyltransferase, 1010
guanine-xanthine phosphoribosyltransferase, 910
meso-inositol fermentation, 779
PEP:sugar phosphotransferase mutations, 17
proline metabolism, 1134
rec mutants, 653
rfa gene mappings, 48, 58, 64
threonine deaminase inhibition, 259
toxicity of L-tryptophan photoproduct, 643
trpB gene, 877
tyrosine regulation, 1254
Schwanniomyces spp.
ascospore morphology, 1380
Serine chemoreceptor, 315
Sex factors
V. cholerae, 707
Shigella
hybrid with *E. coli*, 176
virulence factors, 176
Shigella flexneri
glucosylated O antigen, 1420
lipid-linked glucose, 1420
R factor transfer, 576
Sodium
effect on polyamine metabolism, 1213
Sorbitol
mannitol-sorbitol diauxie, 840
Spermidine
inhibition of putrescine synthesis, 1213
Spirochaeta stenostrepta
fatty acid composition, 629
Spores
B. cereus, 559
B. megaterium, 559, 640
Botryodiplodia theobromae, 1029
calcium location, 559
C. botulinum antigen, 1416
D. discoideum, 1383
germination, 640, 967, 1029, 1383
Schwanniomyces, 1380
T. mentagrophytes, 967
Sporulation
amino acid requirements, 345
B. subtilis, 264, 345, 1270
C. botulinum, 618
exosporium formation, 618
*p*H effects on permeability, 519
potassium content, 264
RNA, 806
RNA polymerase template specificity, 1270
S. cerevisiae, 519, 806
Staphylococcin
properties of, 243
purification from *S. epidermidis*, 235
Staphylococcus aureus
N-acetylmuramyl-L-alanine amidase, 932
cadmium resistance, 761
fatty acid synthesis, 413
glycerol auxotroph, 413
methicillin resistance suppression, 682
plasmids, 1169
rec mutants, 1169
Staphylococcus epidermidis
bacteriocin, 235, 243
penicillinase plasmid functions, 697
Streptococci, group H
bacteriocin, 824
competence, 824
Streptococcus
L-form colonies, 602
Streptococcus faecalis
autolysis, 337
macromolecular synthesis, 337
polyisoprenyl alcohols, 1302
Streptococcus faecium
Mn^{2+} supplementation, 627
protoplast reversion, 611
Streptococcus lactis
carbohydrate metabolism, 1335
membrane-associated proteinase, 474
Streptococcus mitis
aggregation by saliva, 1127
CO production from heme, 1310
Streptococcus pyogenes
L-form, 285
membranes of, 285
Streptococcus sanguis
aggregation by saliva, 1127
Streptomyces antibioticus
phenoxazinone synthetase activities, 1353

Temperature coefficient of growth
thermophilic bacillus, 1040
Thermal inactivation
E. coli protein synthesis, 1177
Thermophilic bacillus
growth temperature, 1040
Thermoplasma acidophilum
lipids of, 1193
L-Thialysine
resistance to in *N. crassa*, 276
Thiamine
transport inhibition, 1438
Thiamine monophosphate
mutants requiring, 1118
Thiamine pyrophosphate
biosynthetic pathway, 1118
mutants requiring, 1118
Thiobacillus neapolitanus
phosphoribulokinase, 532
Thiobacillus novellus
fatty acid content and cultural conditions, 903
Thiogalactoside transacetylase
catabolite repression, 1184
Threonine
aspartokinase inhibition by, 251
Threonine diaminase
inhibition by isoleucine, 259
Thymine
loss from DNA, 646
Transaminase A
components of, 365

Transcription
in DNA replication initiation, 7
post-transcriptionally modified nucleotides, 13
Transduction
his and *ilv* operons, 40
rfa gene mapping, 48, 58
Transfer ribonucleic acid
arginyl-, 102, 1076
histidyl-, 126
hydrostatic pressure effects on, 1222
inhibition of translocation, 188
synthesis mutants, 1150
tyrosyl-, 1254
Transfer ribonucleic acid synthetase
arginyl-, 102
tyrosyl-, 1254
Transformation
Acinetobacter spp., 917
DNA size and activity, 220
donor DNA size, 1157
D. pneumoniae, 1157
group H streptococci, 824
Haemophilus, 751
H. influenzae, 492
interspecies, 917
"ratio effect," 492
Transport
amino acids of *N. crassa*, 276
glycine, 413
Mg^{2+} and Co^{2+}, 148
thiamine, 1438
Trehalose phosphate
inhibition of ADP-Glc pyrophosphorylase, 327
Tricarboxylic acid cycle
partial, 1295
Trichophyton mentagrophytes
germination of microconidia, 967
Tryptophan
genes in *A. calcoaceticus*, 797
induction of ergot alkaloid synthesis, 791
regulation, 93
regulation in *C. butyricum*, 304
toxicity of photoproduct, 653
Tryptophan operon
"unusual" region in *S. typhimurium*, 877
Tyrosine
synthesis regulation, 1254

Ubiquinone
N. crassa mitochondria, 1112
Ultraviolet radiation
DNA breakdown, 1237
E. coli polA1 mutants, 1017
sensitivity in *N. crassa*, 632
sensitivity mutations, 886
toxicity of irradiated media, 649
toxicity of tryptophan photoproduct, 653
T4 phage, 1017
Uridine diphosphate-glucose pyrophosphorylase
M. smegmatis, 327

cis-Vaccenic acid
synthesis mutant, 381
Vibrio cholerae
sex factor-mediated recombination, 707
Viomycin
resistance in *M. smegmatis*, 1
Vitreoscilla stercoria
physiology of, 1052

Xanthine
phosphoribosyltranferase for, 910
X rays
microanalysis of calcium in spores, 559

Yersinia pestis
specificity, induction, absorption of pesticin, 212